GRAPEGROWING • WINEMAKING • MARKETING

JANUARY/FEBRUARY 1991

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LETTERS

Editor,

The Bureau of Alcohol, Tobacco and Firearms (BATF) has amended regulations to permit the interstate sale of wine in 500mL bottles, effective Feb. 20, 1991. This ruling opens new markets to wineries and affiliated businesses, and responds to the latest trends in consumer drinking patterns.

The new size bottle will also permit some producers, who now have a limited quantity of wine on allocation, to increase the number of bottles they produce without increasing the amount of wine they make.

The BATF decision comes as a result of a proposal I submitted to the agency on behalf of Merlion Winery, together with a number of journalists, consumers, and other members of the trade, in February, 1989. BATF received 300 comments regarding the proposal, and 286 of them were supportive of the 500mL bottle concept.

Wineries previously were allowed only to sell wine in 500mL bottles within a state and for export. Because of lack of demand, no U.S. glass companies have been producing this size bottle and the cost of imported glass generally is considered prohibitive.

The new surge of interest among wineries in the 500mL bottle is promising. If enough wineries demand this size bottle, U.S. glass companies may start producing it, thus reducing the cost. At least two domestic glass suppliers, California Glass and Vitro Packaging, have shown interest in handling the 500mL bottle.

The 500mL bottle will allow two people to enjoy two 4-oz. glasses of wine each with a meal, considered a more practical and attractive alternative than either the 375mL or 750mL bottles. Allowing the consumer to enjoy fine wine in moderate amounts has been an ongoing concern of Merlion and many other wineries over the years. This size container will allow a couple at a restaurant to consume a whole bottle of wine with their meal and not fear reaching a legal intoxication limit.

The 500mL bottle also is more convenient to consumers in terms of cost. When new federal excise taxes are added to 750mL bottles, the price will go up and some wines will not be affordable. The 500mL bottle provides a way for people to enjoy wine at a lower net cost.

Kasia Winiarski of Stags Leap Wine Cellars says, "We are 100% for it. For some time we've supported restaurants that have wine by-the-glass programs, because couples don't want to finish a whole bottle of wine with a meal — it's too much. The 500mL is a good alternative. If the wine industry supports this, it will be a wonderful way of showing our concern about the moderation issue."

According to Larry Williams, Director of Marketing at Jordan Winery, "We want to give the customer what the customer wants, and the message for some time has been that the consumer has been drinking less and drinking better. The premium producers have to consider the 500mL bottle if they're going to give the consumer what they're asking for.

"The 500mL bottle fits per capita consumption patterns in the U.S. more closely than the 750mL," he says. "We're giving the consumer a choice."

So are we at Merlion. Ultimately 25% of our production of wine will be in 500mL bottles.

The BATF's amendment allowing interstate sale of wine in 500mL bottles is a boon to wineries and related industries. Those interested in tasting the benefits of the 500mL bottle — expanded market share and satisfied customers — should notify bottle suppliers such as California Glass and Vitro Packaging. Market demand will generate domestic production and thus lower prices for the new size bottles.

George Vierra, General Partner
Merlion Winery, Napa, CA

Editor,

I would like to make a personal plea to my industry. I make it as one who has been around wine and wineries since I was six years old. There are few things I care for more. These views are mine. This is a plea from me to you.

If we can remove ourselves form our industry for a moment we can see the November,

Continued on page 52

February 28
1991

SELLING, MARKETING AND RETAILING TOGETHER

S.M.A.R.T. Conference

What makes the Southern California market so different?
How can wineries "grab the reins" in the 1990s? Dr. James Crupi discusses power and leadership in the new decade.

Who drinks what and where do they buy it?
Demographics expert Robert Olinto of the *Orange County Register* will profile the wine consumer who shops at the Price Club or Ralphs Grocery and provide many other insights.

What do key merchants want from wineries?
Leading merchants will provide ideas to make every winery better prepared for the new year.

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PW

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Wine cave at Pine Ridge Winery, Napa, CA. Photo by Fred Lyon.

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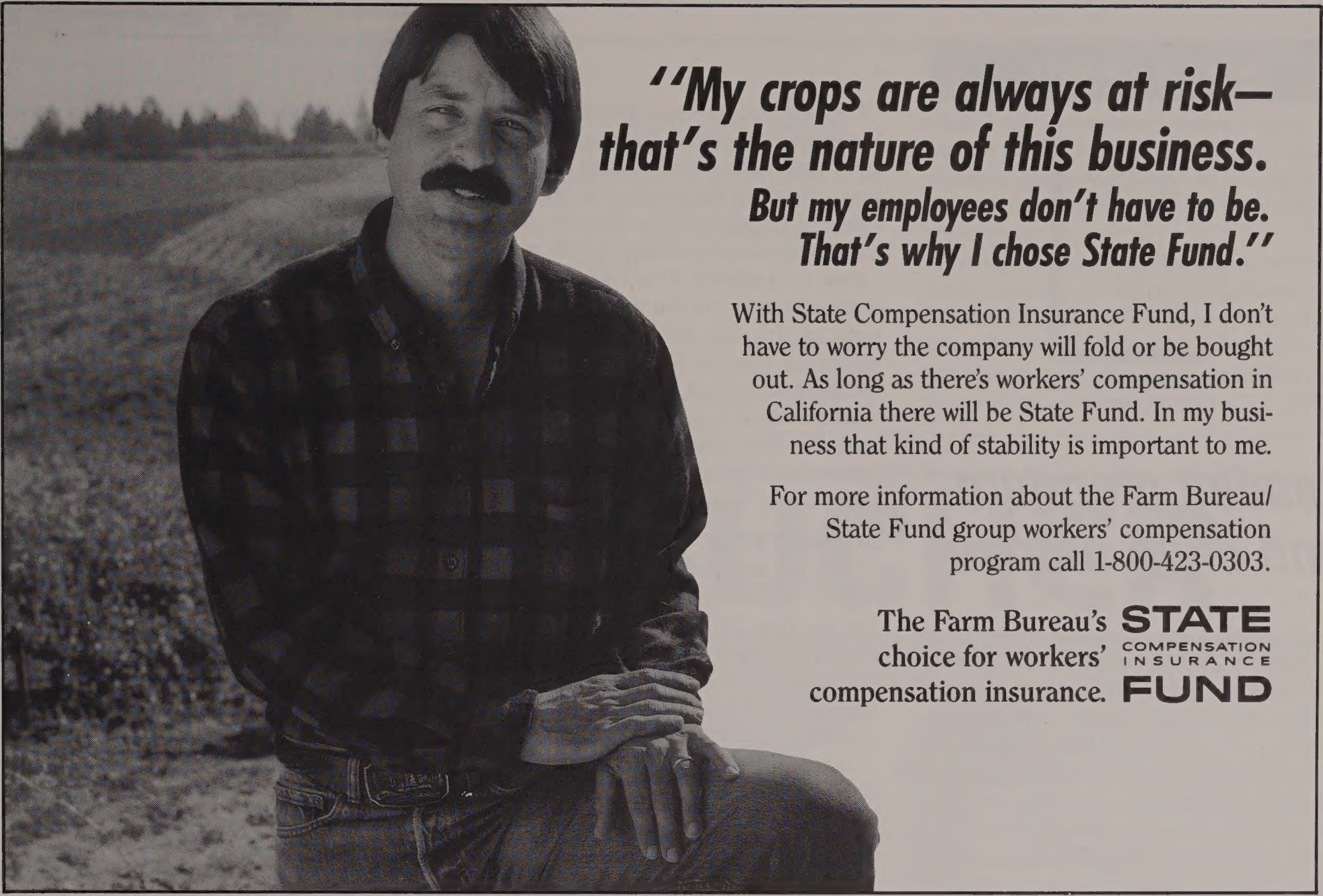
ELEVEN YEARS OF SERVICE TO THE WINE INDUSTRY



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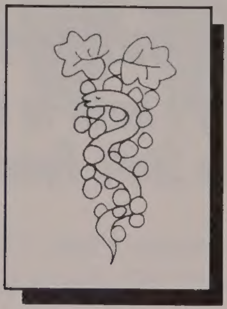

Wells Shoemaker, MD

Leaded premium–end of an empire

Lead toppled the Roman Empire long before it ended the careers of Billy the Kid and Bonny and Clyde. Lead contamination of premium wine — not the barbarian hordes — undid the Romans.

Lead's density, malleability, low melting point, and chemical reactivity make it a seductively versatile element. It lent its Latin name to the discipline of *plumbing* before the medical term *plumbism* also ominously entered the dictionary.

Low pH and high Pb — a conspiracy

Elemental lead does not readily dissolve in plain water, but people contribute to their own poisoning by leaching it out with acidic liquids. That lustrous, antique yellow ceramic pitcher won't hurt anybody as a flower vase, but use it to serve orange juice to your children for a few years, and their grades may suffer.

Leads binds to sulfhydryl groups on human proteins, particularly to enzymes in the blood-forming sequence. It is stored for years in the skeleton, gradually accumulating toward toxic levels. Eventually, subtle nervous system symptoms develop, followed by a notorious type of severe abdominal pain called saturnine colic.

Anemia, kidney damage, gout, and progressive brain damage carry victims inexorably through a miserably painful and debilitated descent through insanity toward death.

Roman high society was probably the first — and the last — to use wine as a beverage of abuse, but it wasn't the alcohol that betrayed the Empire.

The Romans unwittingly carried the acid extraction of lead to a vile extreme. They cherished a beverage made by slowly cooking grape must into a thick syrup called *sapa* or *defructum*. The recipe insisted on a leaded cooking vessel.

The *sapa* became sweeter with time, as the water evaporated, the sugars caramelized, and as the lead acetate concentration soared. In the absence of cane sugar, *sapa* was widely used by Roman cooks to cater to the sweet cravings of their masters.

Sapa was added in a 1:48 dilution to young wine to suit the sweet, madeirized taste of the day. Modern winemakers might ask how the Romans stabilized the resultant wine from refermenting. Simple: lead acetate is a potent fungal inhibitor, and the wine merchants exploited this preservative property to store their adultered wines until the next vintage.

Dubious privilege

Only the aristocracy enjoyed the privilege of drinking these blended wines. For the first 200 years AD, nearly every Roman emperor and his entourage swilled outrageous quantities. Tiberius was known behind his back as 'Biberius'. Lucullus used 4 million liters for one celebration.

Historians such as Pliny have accurately chronicled the lives of the emperors. All suffered monotonously similar symptoms, perhaps best exemplified by Claudius, whose illustrious career stretched from 41 to 54 AD and whom one historian describes as "an intemperate glutton who found a ray of wisdom at the bottom of an amphora."

Claudius suffered disturbed speech, weak limbs, an ungainly gait, tremors, fits of excessive anger and inappropriate laughter. He slobbered. His feet were wracked with gout, and his stomach aches became legendary.

These findings, presented for a medical student's final exam question, would be a simple 'gimme' for lead poisoning.

Following the Roman wine merchant Columella's recipe, recent experimental reproductions of Roman wines contain about 20 milligrams of lead/liter. It would have been rare to find a Roman in the court who consumed a paltry liter/day. A **half** milligram/day is sufficient to cause chronic lead intoxication. And you wonder why Nero couldn't find his pitch!

More recently, in the 16th through the 18th centuries AD, lead and wine continued their ignoble liaison. Disreputable European wine merchants, confronted with poor vintages, periodically caused vicious epidemics of lead poisoning, eloquently described by physicians of the era.

The merchants added 'litharge', a concentrated lead compound, to green wines to improve flavor, body, and sweetness. Innocent consumers ingested such astronomical lead dosages that Caligula probably writhed in his tomb.

Blame it on the wine

These European epidemics typically occurred in the autumn following the short, cold summers that typified the late 1600's and early 1700's. Some physicians blamed the epidemics on "sour and harsh vintages", fixing upon the association with wine, but not recognizing the human culpability.

The caricature of the fat, red-nosed, port-tippling English nobleman with a diabolically throbbing toe raises the query that it was lead-induced saturnine gout that kept him off his feet. Samples of fortified wines from 1770 to 1820 revealed lead concentrations of 300 to 1,900 micrograms/liter — not quite Roman, but well into the toxic range. The lead presumably came from distillation vessels.

Lead extraction wasn't limited to grape juice. Lead-soldered vessels for apple cider in England led to outbreaks of 'Devonshire colic'. 'Dry gripe' plagued New World consumers of rum distilled in similar containers. Moonshine whiskey condensed in auto radiators wreaked considerable havoc in the Appalachian mountains during Prohibition.

A home winemaker in New York recently poisoned himself and his family with wine contaminated by lead leaching out of the blue tile he installed in his fermenter. The wine contained 19.5 milligrams/liter of lead, about the same as ingested by Claudius, and causing the same classic symptoms.

That was then and this is now

All of the above examples were caused by ignorance, greed, and abuse. How do they pertain to today's wine, when such factors have been replaced by science, quality, and moderation?

All food products grown on the surface of the planet will contain trace amounts of lead which come from the atmosphere and the ground water. A bottle of 20th century wine contains comfortably less than the World Health Organization's recommended daily maximum.

Lead alloy foils, however, represent a potential additional source.

Champagne cellarmen in the 19th century wrapped bottles *en tirage* with lead foils to keep rodents from chewing the cord ties that secured the corks . . . and undoubtedly saved countless cellar rats from blowing their squeaky minds.

The Russian aristocracy and English gentry who bought the bubbly identified the pliable foils as stamps of ultimate elegance. The custom endured as decoration long after the Tsars went to their rewards.

A leaky cork may allow the acidic wine to slowly work on the lead capsule, forming a deposit of absorbable salts in the tiny groove between the lip of the bottle and the edge of the cork.

While there is no way for this material to enter the unopened bottle, some may wash into the glass when the wine is poured. The sommelier who discretely wipes the bottle mouth with a linen cloth offers an example of both good manners and good health.

Lead on the way out

The Wine Institute of California passed a resolution in 1990 calling for the replacement of lead-containing capsules with alternatives such as tin, aluminum, or plastic over the next two to three years, allowing time for retooling.

Several states have passed regulations calling for alternative bottle decorations, effective in 1991 or 1992. These actions make sense for both global environment as well as individual consumer safety.

Our marketing machinery will need to educate our friends that the substitute capsules do not imply cheap quality.

Meanwhile, if you encounter a shaggy cellar veteran whose time has come, use the Heimlich maneuver, but by Great Caesar's ghost, don't resuscitate him mouth to mouth.

Post script

*An anecdotal medical study in **Lancet** in 1987 measured the amount of lead rinsed off a wine bottle lip with and without wiping. A single bottle — or even dozens — would not represent a risk for short-term harm, the cumulative heavy metal load for a busy wine drinker could theoretically approach troublesome levels.*

Considering himself a 'busy wine drinker' for two decades, Dr. Shoemaker performed lab tests on himself for indicators of lead exposure. The blood lead level was unmeasurably low (less than 10 micrograms/deciliter) and free erythrocyte protoporphyrin 14, at the

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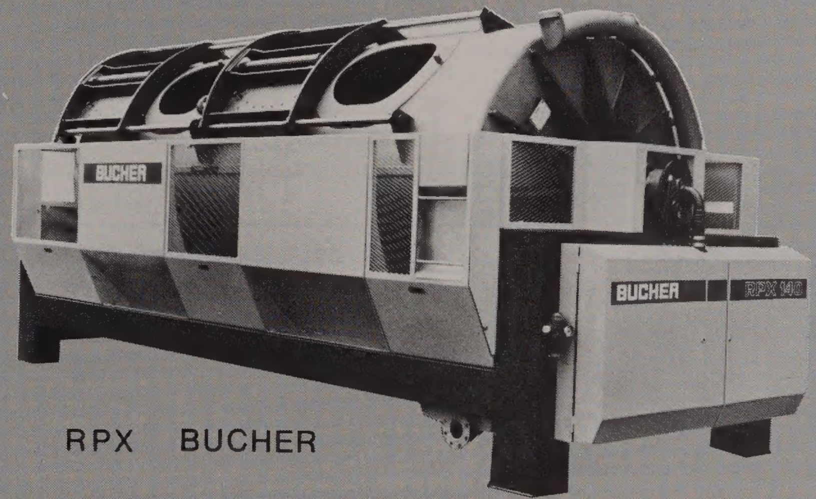

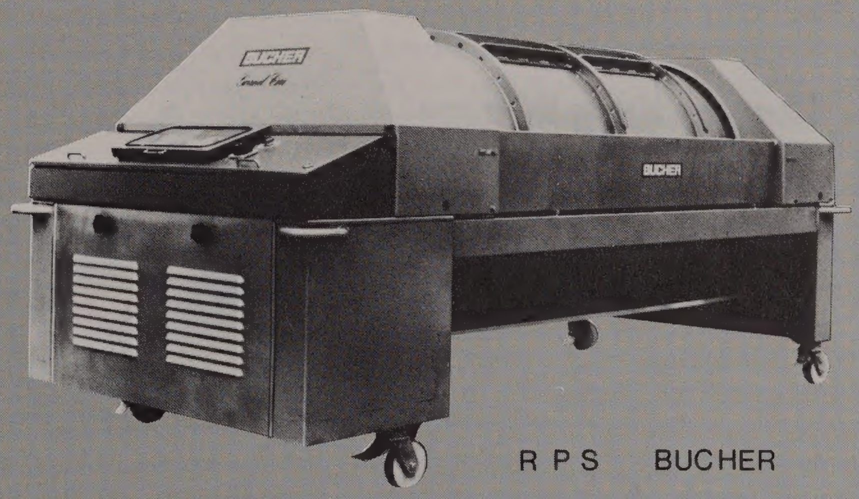

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very low end of normal. His hematocrit (anemia test) was 46%, a comfortably high level for a backpacker and blood donor. In other words, you can't blame his difficult attitude on lead, yet.

As the winemaker at Salamandre Wine Cellars, Dr. Shoemaker switched to non-metallic foils in 1988. While he's happy with the health aspects of the change, he acknowledges that he misses the ritual of gently peeling off the old lead foil: "The plastic ones are like a Velcro bra clasp — there's just no romance to it." ■

* * * *

The medical library at Stanford University, Palo Alto, CA, lists 30 references for lead and wine from the last seven years, representing work from nine different countries. Sentinal references for this column included:

Nriagu, ***New England Journal of Medicine***, 308:660, March 17, 1983.

Eisinger, ***Medical History***, 26: 279, July, 1982.

Marks, ***Lancet***, Dec. 19, 1987, p.1473.

A full bibliography is available on request.

Alternatives to tin/lead capsules:

PWV surveyed all capsule suppliers in the U.S. wine industry to prepare the following list of alternatives to tin/lead capsules. Look for photos and more extensive details on capsule alternatives in the July/August 1991 **PWV**.

Suppliers:

California Glass Co.: All tin, aluminum, aluminum polylaminate, and heat shrink. Contact: 155-98th Ave., Oakland, CA 94603, Tel: 415/635-7700, Fax: 415/635- 4288; OR 13102 Warnock Rd., Oregon City, OR 97045, Tel: 503/657-8971, Fax: 503/657-7299.

Cork & Seal Cebal: All-tin, aluminum composite, PVC heat-shrink, and polystyrene heat-shrink. Contact: 5425 Napa-Vallejo Hwy, Vallejo, CA 94589, Tel: 707/ 257-6481, Fax: 707/257-8028.

Cru Industries Inc.: All tin capsules. Contact: 100 Coombs St., Napa, CA 94559-3941, Tel: 707/255-5994, Fax: 707/ 255-0972.

International Closures & Supplies Co.: Shrink: PVC, polystyrene, polyethaline; and polylaminate aluminum. Contact: 2997 Teagarden St., San Leandro, CA 94577, Tel: 415/ 483-3750.

KLR Machines, Inc.: Sanoplast heat shrink capsules, OPS (Oriented PolyStyrene), and PVC heat-shrink capsules. Contact: 350 Morris St.#E, Sebastopol, CA 95472, Tel: 707/823-2883, Fax: 707/ 823-6954; OR 47 W.Steuben St., Bath, NY 14810, Tel: 607/776-4193, Fax: 607/ 776-9044.

Lafitte Cork & Capsule: All-tin, all-aluminum, polylaminated aluminum, PVC heat-shrinkable (open and closed-top), and heat-shrinkable polystyrene. Contact: 908 Enterprise Way, Napa, CA 94558, Tel: 707/258-2675, Fax: 707/258-0558.

Pickering Winery Supply: Savoye aluminum, polylaminated, and heat shrink capsules. Contact: 1300-22nd St., San Francisco, CA 94107, Tel: 415/821-2400.

Ramondin USA, Inc.: All-tin capsules. Contact: PO Box 2266, Napa, CA 94558, Tel: 707/ 944-2277.

RLS Equipment Co.: All-tin and PVC heat-shrink. Contact: PO Box 282, Egg Harbor City, NJ 08215, Tel: 609/965-0074, OR RLS West (California) 800/527-0197.

Scott Laboratories: All-tin capsules, PVC and oriented polystyrene capsules, polylaminate and aluminum capsules. Contact: PO Box 750249, Petaluma, CA 94975-0249, Tel: 707/765-6666 OR 860 Brock Rd. South, Pickering, Ontario, Canada L1W 2A1, Tel: 416/ 839-9463.

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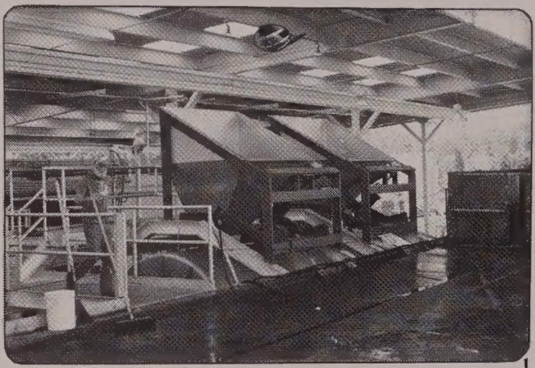

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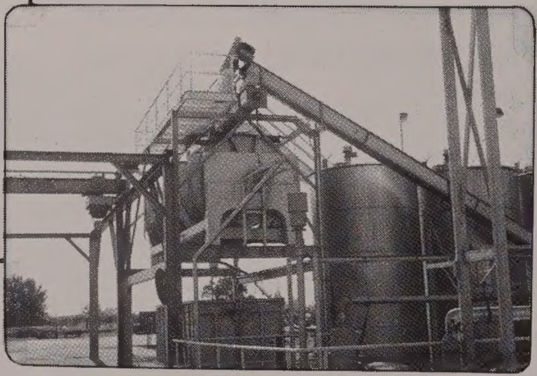

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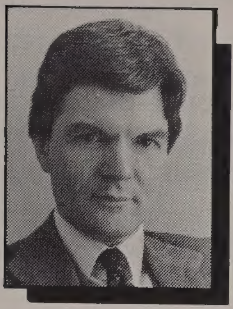


R. Corbin Houchins

Qualifying for the domestic small producer credit

In this column, we look at the 'small winery' tax relief included in the gallonage tax increase which became effective on January 1, 1991.

Overview of the new law

Although trade associations and the government will have provided numerous explanations of the new excise tax by now, it may be useful to begin with a brief review.

The main point of the new law is easy to state. For product removed from bond after December 31, 1990, the gallonage tax imposed by Title 26, § 5041 of the United States Code, which was $0.17 for table wine, $0.67 for still wine over 14% through 21% alcohol, $2.25 for still wine over 21% through 24% alcohol, $2.40 for artificially carbonated wine and $3.40 for 'champagne and other sparkling wines' (referred to below for convenience as naturally sparkling wine), increased on January 1 by $0.90 per gallon in all categories except naturally sparkling wine.

Wine removed from bond before that date which was held for sale by anyone on January 1, 1991, will be subject to a floor stocks tax of $.90 per gallon, against a flat credit of $270.00 and a per-gallon credit on some wine (discussed below).

The taxpayer is the person who held it for sale except that 'dealers' (a term which includes wineries as well as wholesalers and retailers) holding less than 500 gallons of taxable alcoholic beverages on January 1, 1991 are exempt from the floor stock tax (though not from the duty to inventory and file a return).

The statute requires that the floor stocks tax be paid in full by Sunday, June 30, 1991, and is silent on the question of prepayment or installments. At press time, the Bureau of Alcohol, Tobacco & Firearms (BATF) had settled on a single payment by June 28, 1991.

It is doubtful that Congress adequately considered the practical implications of auditing the floor tax on such short notice. At press time, the Bureau anticipated broadening the single-day January 1 window for inventories to a period beginning December 26 (or, for businesses closed from that date through January 1, 1991, the last business day before December 26) to January 10.

Inventories not taken on January 1 must be adjusted to the first day of the year from records of receipts and dispositions. Whatever method is chosen, it appears that quite a few people will have spent part of the holiday season counting boxes and that the Bureau's enforcement personnel will be heavily committed to audit activities in the early part of 1991. The effect on turn-around times for new permits, extensions of premises, etc., remains to be seen.

The break for not-so-big wineries

Most of the complication arises from the 'domestic small producer credit'.

'Small' may be a bit inaccurate, since preliminary calculations indicate that fewer than 10% of U.S. wineries will pay the full rate. In a sense, it is a 529% tax increase on rather large wineries, with much lesser increases, ranging down to zero, for most of the industry.

Again, it is easy to state the basic rule: All wine *withdrawn from bond* beginning January 1, 1991 will be taxed at the new rates. Despite what one hears in the unofficial explanations, there is no 'exemption'.

However, the first 100,000 gallons of *withdrawn* wine (not counting naturally sparkling) which was produced at 'qualified facilities within the United States' will generate a credit that can be applied against any Title 26 tax (which includes not only the gallonage tax, but also such levies as the federal income tax). No doubt the credit will be taken directly against the gallonage tax in the vast majority of cases, producing a net rate that may represent no increase at all.

The limitation of the credit to 'qualified facilities' was doubtless borrowed from the statute governing the longstanding reduced excise on beer removed from bond by small brewers. Its inclusion is somewhat anomalous for wineries, since 'qualification' is a substitute for obtaining a federal basic permit.

(Brewers were able at Repeal to obtain special statutory treatment exempting them from the requirement of obtaining a permit from the BATF, but their facilities must still be qualified and bonded.)

The amount of the credit is $0.90 per gallon multiplied by a factor based on gallons of all classes of wine produced (not gallons withdrawn), including sparkling. (Probably the statute also includes over-24%, but apparently the Bureau does not count it, and I do not know of anyone who would make it anyway.) That factor ranges from 0.00 for wineries that produce more than 250,000 gallons during the calendar year to 1.00 for wineries that produce less than 151,000 gallons during the calendar year. The range is in increments of 0.01 per 1,000 gallons produced during the calendar year.

Interpretations

Several terms and concepts require administrative interpretation. The following explanations are based on the 'kit' furnished with the floor stocks tax return and on circulars published by the Bureau, dated November 26, 1990, which wineries should have received about the middle of December.

A domestic small producer credit applies to the floor stocks tax on merchantable wine held for sale *by the producer* on January 1, 1991. The tax on tax-paid wine which would have been taxable at the new rate but eligible for a credit if the tax increase had applied in 1990 and if the wine had been removed on the last day of that year is reduced by the amount the credit would have been. Industry Circular 90-4 interprets 'held' to apply to title to the wine rather than physical location, so that tax-paid wine owned by the producer but in transit or located at a warehouse should be entitled to the producer credit against the floor stocks tax.

The Bureau has clarified the starting point of the graph for decreasing the credit as production gallonage increases from 150,000 to 250,000. The statute says that the allowance is reduced "1 percent for each 1,000 wine gallons of wine during the calendar year." Since it does not add "or part thereof", the full credit should be available if production does not reach 151,000. The Bureau accepted that reading in Industry Circular 90-4, so wineries between 150,000 and 151,000 take the full $0.90 credit.

Another ambiguity in the statute could produce minor differences in calculating the credit at some production levels. The

BATF method for calculating the net tax is to subtract 150,000 from the production level, divide the result by 100,000, subtract the resulting percentage from 1.00, multiply the difference by 0.9, and subtract the product from 1.07. For a 187,000 gallon production level, that would produce a $0.50 net tax, a penny more than a table based on reducing the factor by one percent for each 1,000 gallons and rounding to whole cents.

The statute does not specify the production-measuring year. Industry circulars indicate that the small producer credit is to be claimed based on the winery's projection of production for the same year as the tax liability, that is, starting with 1991.

If a winery begins the year with a projection resulting in a credit, then discovers at crush that it will actually be entitled to a lower credit or no credit, a payment to correct the underpayment must be made in the same tax return period in which production exceeded the projection.

We do not know how much leeway will be allowed in projections. At one end of the spectrum, the statute would support an interpretation allowing all wineries to consider themselves small producers until they actually produce more than 250,000 gallons in the tax year, which would be a cash flow benefit for some.

Some precedent is provided by the existing reduced excise tax on the first 60,000 barrels withdrawn in a calendar year by small domestic brewers, since the wording is virtually identical to the new provisions for wine. Beer regulations do not specify the production-measuring year, but simply say that to be eligible for the reduce rate the brewer may not produce more than 2 million barrels 'per year'. That leaves to enforcement personnel the task of classifying brewers, who must file a letter with the Bureau in January of each year estimating their production for the year. Generally, if the letter reflects a reasonable belief that it will come in under 2 million barrels by the end of the year, the Bureau accepts the reduced rate.

Nothing prevents wineries from suggesting regulations. If the interpretations and regulations presented by the Bureau appear disadvantageous, the industry should present a request for rule-making.

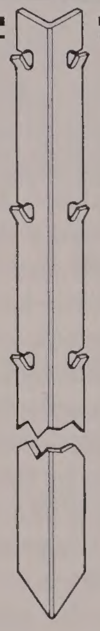
A wild card

A complication is that the law might have to be amended, or at least interpreted to operate differently from its literal content, to prevent the credit from being regarded as an illegal subsidy under the General Agreement on Tariffs & Trade ('GATT').

Rumors from Washington, D.C. early in November indicated that the 'fix' could be requiring all producers to pay the full amount on withdrawals during the year, with the small producer credit calculated retroactively after the close of the calendar year, to be applicable to 1992 taxes.

In my opinion, the statute as drawn would not support such a regulation, and the likelihood of changing it before technical amendments are considered in the next Congress is remote.

Another proposal to prevent illegal discrimination against imports, which was advanced by lobbyists for a trade association while the new law was being drafted, would limit the small producer credit to retail sales by the producer. Theoretically,



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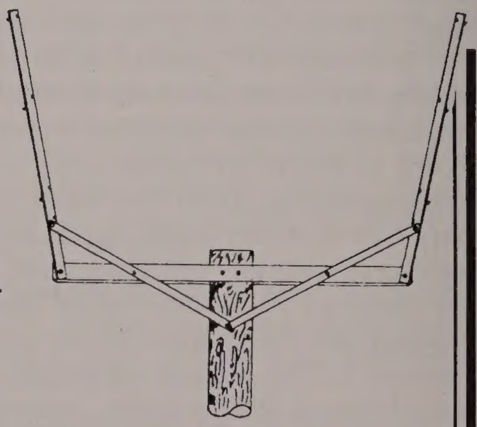

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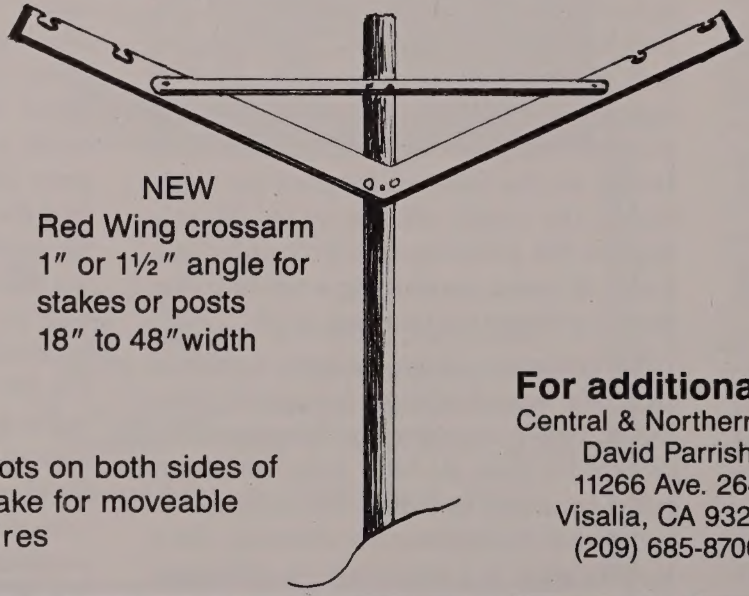

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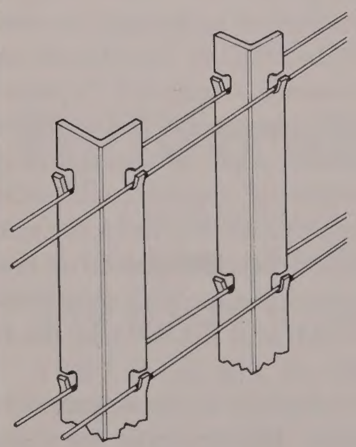

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foreign producers would have the same rights if they chose to have retail outlets, but state law would present a significant obstacle.

At press time, two lawsuits were rumored to be in preparation to challenge the new law under the supremacy clause of the United States constitution, one by large domestic producers and another by a European trade group.

The theory of such a suit is that a small producer credit available only to domestic wineries violates our treaty obligations under GATT, that treaties are constitutionally superior to domestic laws in cases of conflict, that the tax increase would not have been adopted without the small producer credit, so if it is invalid the whole law fails.

The same argument could be made with respect to the small capacity brewery tax break, which has been with us for decades, but no one has gotten upset over it because of its relatively minor economic impact.

It is impossible to predict the outcome of litigation or the speed with which a court might act if it decided the new levy were invalid. Regardless of how the legal issue is decided, the time line could permit collection of the tax until after the next session of Congress considers changes.

Unanswered questions

By publication time I trust we shall have learned something about proposed regulations and policies of the Bureau on the following matters. Whether the issues will have been settled is another question.

- ***What is meant by 'produce' for the purpose of determining how many gallons a taxpayer produces in the calendar year?***

For most wine, 'produce' will probably have the same meaning as for the statistical reports or Form 702 required under the Internal Revenue Code. Thus, in counting gallons produced, a winery would include only primary fermentation gallonage, plus any incremental volume produced by amelioration, fortification, sweetening or adding things to formula wine, as indicated by Industry Circular 90-4.

One has to say 'most wine' because at press time a special rule was being considered for wine bulked in. The rule would count as production any wine bottled by the winery that removes it from bond for sale.

Note that it does not matter where the production takes place. Thus, a small domestic winery owned by a large overseas producer could not claim a credit, because of the 'controlled group' rules discussed below.

- ***How will the small producer credit be applied to wine which is first removed from bond by someone other than the producer?***

There is real potential here for dispute over the meaning and application of the new law.

The gallonage tax is a federal excise tax imposed on "all wines . . . produced in, or imported into, the United States." The tax is 'determined' when the wine is removed from bond. The person liable for payment on domestic wine is the proprietor of the bonded wine cellar from which the removal takes place, with two exceptions.

The first exception is that wine removed from bond for transfer to another bonded

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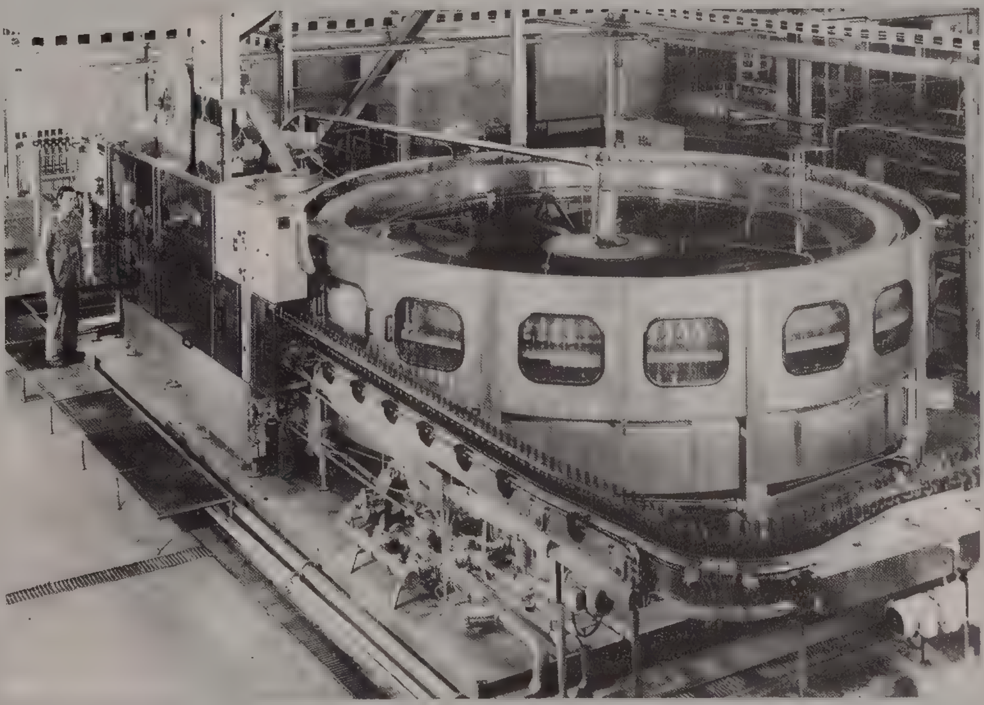

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premises is not tax-determined, and liability shifts from the proprietor of the transferor premises to the proprietor of the transferee premises. The second is withdrawal for export or other tax-free withdrawal recognized by statute.

The small domestic producer credit is determined at the same time the tax is determined and can be taken as a credit when the tax is payable. Since the tax is payable by the proprietor of the premises from which the wine is removed for sale (not for bond-to-bond transfer), it seems clear that the same proprietor will claim the credit.

What is not so clear is on whose production level the credit is to be calculated. The unhelpful statutory language is, "in the case of a person who produces not more than 250,000 wine gallons . . . there shall be allowed" a credit. At press time, the announced general rule was that wineries removing wine for sale take the credit according to their own production, irrespective of whether the winery that fermented it would be entitled to a credit if it were the taxpayer.

In my opinion, the Bureau could not declare that only the original producer of the wine may claim the credit, since the new statute omits a phrase which was included in the reduced beer rate statute precisely to achieve that result. The proper interpretation in my view would be that the omission was purposeful, in order not to deny small wineries the credit when they remove wine that was wholly or partly bulked in from a large winery. Thus, the intention as of early December could be regarded as compelled by the statute.

On the other hand, the statue empowers the Bureau to prevent ineligible producers from benefitting from the credit. Application of that requirement will doubtless involve some highly fact-specific rulings. As explained by a Bureau staffer in early December, the basic test will be whether the ineligible winery is able "to market its own products at a price which reflects less than the full rate of tax."

Examples of application of that principle offered by the Bureau indicate that no credit can be taken by a small winery or by a bonded wine cellar on wine shipped in from an ineligible winery bearing the ineligible winery's labels. However, custom crushed wine made at an ineligible winery and shipped either in bulk or bearing the eligible winery's label would generate a credit when removed for sale by the eligible winery, *unless* the large winery was paid a higher price reflecting the availability of the credit than it would receive for wine that would not generate a credit. The reason for the proviso is that in such an unlikely case the large winery would be considered by the Bureau as receiving a benefit from the credit.

Serious issues arise from the operations of bonded wine warehouses (or, more correctly from the federal viewpoint, 'bonded wine cellars'), which produce no wine.

The most straightforward approach would be to allow the warehouse proprietor, who is the taxpayer when the wine is withdrawn for sale, to take a credit based on the fact that it is a "person who produces less than 250,000 gallons of wine during the calendar year." The credit would be $0.90 on the first 100,000 gallons out of the warehouse. Since a warehouse operation even of modest size would hit 100,000 gallons quite early in the year, that would mean that its small winery customers would be in effect deprived of their tax credit unless they build case storage space of their own.

A fairer but more troublesome method would be to require the warehouse to maintain information regarding both the production level and the withdrawal record of its customers. Tax credit determination would then focus on 'eligible wine', rather than an eligible facility. The warehouse would simply take the credit that the small producer could have taken if the wine had been transferred tax-paid.

Unfortunately, indications in December were that the approach for bonded wine cellars will mix the worst of both approaches. The Bureau announced it would require the expensive exercise of recording and tracing inventory by producer size, but only to determine whether the producer's production level exceeded 250,000 gallons. If not, the warehouse could take the maximum credit of $0.90 on that producer's wine, without reduction for production levels between 150,000 and 250,000, but only on the first 100,000 gallons withdrawn for sale from the bonded wine cellar.

If the government sticks to that approach, it will mean the end of off-premises warehousing in bond for many small winer-

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ies. This may be another area where the industry should propose regulations.

• ***Will my bond be calculated on the tax net of credit?***

Alas, Industry Circular 90-5, dated November 26, 1990, suggests that the Bureau will require face amounts based on tax liability of $1.07 per gallon from all proprietors of bonded premises, regardless of size.

Portions of the Internal Revenue Code dealing with bonds were not changed by the new law. The Code requires a bond for "not less than the tax on any wine or distilled spirits possessed or in transit at any one time," with a two-tier maximum of $50,000 or $100,000 and a minimum of $1,000. Existing regulations require that the bond 'cover the liability' for gallonage and occupational taxes. The Bureau has historically interpreted coverage to apply to the maximum potential tax, given the capacity of the winery.

It is true that 'the tax' is $1.07, and that the credit is a separate line item. However, in my opinion the Bureau has ample power to interpret the statutory requirements to mean real-world tax exposure. Administrative agencies seem often to interpret their powers very narrowly when one is asking for their help. I hope that excise tax bonds will not be such a case, but at press time the Bureau had taken the position that it would have to ask Congress for a technical correction next year in order to accept net tax bonds.

Even if we are facing a demand for enormous strengthening bonds, the law does not require the Bureau to shut small producers down if the bonds are not forthcoming immediately. Assuming that a winery posted sufficient bond when it was established, the Bureau has discretion with regard to how rapidly the strengthening bond must be filed and approved.

If the small producers can have until after Congress has considered technical amendments, the problem might be averted. Otherwise, small producers with weak balance sheets may have to look at paying the $0.17 at once.

Tax Strategies

Much interest has been generated by the possibility of converting larger wineries into aggregations of small producers, or larger dealers into groups of entities holding no more than 500 gallons on the first of the year.

There is already experience with that issue in administering the current lower excise tax for domestic brewers of no more than 2 million barrels annually. The basic principle is that the credit will be apportioned among the members of a 'controlled group'. Thus, any tax saving depends upon avoiding classification as a member of such a group.

Controlled group rules are a fixture of corporate income tax law. The gallonage tax law adopts the same approach, but with a lower threshold of common control. The rules are too complex to summarize accurately here, but in very rough outline they require an examination of relationships among business entities to find a common parent, or a group of five or fewer persons, with the power to vote more than 50% of the stock or other voting units of the members of the group.

If it appears that industry members are able to achieve separate small domestic producer exemptions for aggregations of producers so as to benefit a single corporation, individual or other entity, the Bureau will doubtless use its regulatory power under the new statute to prevent that result. Even so, it may be possible to devise workable tax reduction methods involving innovative forms of organization.

Stay tuned

No doubt the regulations which were being finalized in the Treasury Department at press time will provide grist for further discussion in a future column. ■

PWV T-Shirt Contest

PWV invites you to submit your original, humorous, artistic, outrageous, yet positive T-shirt that your winery has produced for either employees or visitors to the first *PWV* Best T-Shirt Contest. Maybe this will inspire your winery to put prose and art to a T-Shirt if you have not already.

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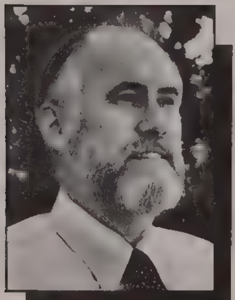

D.R. Storm, Ph.D, P.E.

Water Trivia

I am always puzzled by the writers of drought-era journals and newsletters who, while trying to provide readers with eye-catching copy, present bizarre tables comparing how much water certain activities or industries use. (See water use table below made gastronomically correct by inclusion of table wine data.)

Each water user in the enlightened and very environmentally conscious City of Davis, CA receives a quarterly newsletter that gives a four- to five-page array of useful and useless water facts.

The importance of water in our community was clearly demonstrated in September, 1990 when City employees were discovered using bottled water (purchased at City expense) for coffee and other ingestive purposes. Needless to say, the City's water czar was shocked to learn of the conspiracy and lack of local water loyalty within the City's own ranks. Even though an outright ban on drinking bottled water by City staff did not occur, the City fathers did dictate that bottled water was no longer to be purchased using municipal revenues.

*How many gallons of water does it take to produce one serving of:**

a) almonds - 12
b) tomatoes - 3
c) rice - 36
d) steak - 2607
e) soft drink - 10
f) table wine - 0.21 per 4-oz. serving

Commodity 'f' was calculated by the author and added to the list so that my water use 'menu' would not have to include a soft drink with steak.

Total water required for production of one steak dinner with wine: 2,658.21 gallons. **Note:** *Does not include water required to wash dishes, water consumed at dinner, or washing hands after dinner.*

* ***Water Watch**, 2nd Quarter 1990, City of Davis, Dept. of Public Works, Water Division.*

Water contamination and plumbing materials

Part I

The Problem

With the evolution of new pipe materials and jointing systems for potable water piping in the late 1950's came unforeseen health hazards that began to appear about 1985.

For example, leaching of lead from lead-lined tanks in drinking fountains was identified as a chronic problem in older elementary and secondary schools on the east coast.[5] With all food and beverages, including wine, now under a continuous, tightly focused, regulatory microscope, it would seem prudent that every winery ensure that their plumbing system is not incidentally contributing contaminants to the finished product.

Naturally-occurring ethyl carbamate in wines continues to occupy much of the current enological research and printed space in technical journals, such as the Journal of the American Society for Enology & Viticulture. This potential carcinogen may have to share some future research effort and print with heavy metals. Lead, related toxic heavy metals, and volatile organic compounds due to commonly used pipe and jointing materials will be discussed in this two-part series.

Lead, lead pipe and lead tin solder

Lead is toxic to humans in minute quantities and like other heavy metals of its chemical grouping, lead is absorbed in tissue and bone and is not detoxified by the body's defense systems. Ellen Silbergeld, an expert on lead toxicology reported that 60% of all U.S. children under the age of six are being exposed to levels of lead contamination that could damage their brains.[1]

Dr. Silbergeld notes that the U.S. has always dealt with lead in a compartmentalized fashion, first banning lead in paint, then in gasoline and finally in drinking water.[ibid] Silbergeld cites our passion for using lead because it is plentiful and cheap.

Lead pipe and fittings are still permitted for use in only one American city — Chicago, for water service lines of two inches and less.[3]

Another source of lead in drinking water is the lead-tin solder that was used by plumbers for nearly 40 years before it was prohibited by federal law in 1988. The so-called Lead Contamination Con-

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trol Act (LCCA) was aimed at controlling lead exposure to children. The dissolved lead concentration for school drinking water was set by the LCCA at 20 ppb. (parts per billion).

The Environmental Protection Agency (EPA) identified lead-lined tanks in water coolers as the major culprit in lead contamination.[5] While the use of lead-tin solder has been banned, it has taken a while for the plumbing industry to embrace non-lead solders for copper pipe jointing. Much higher temperatures are required for tin-antimony or tin-bismuth solders to melt and 'run'.[2]

Economics has also played a part in the transition to non-lead solder. For example, tin antimony solder costs twice as much as its banned lead-tin predecessor.[ibid]

Faucets and valves too!

Chrome-plated water stops (valves) and kitchen faucets have also been identified as a source of water-borne zinc, copper, lead, chromium, and cadmium.[4] The investigators concluded that the valve/faucet contributions of chromium and cadmium were not significant when compared to the published Safe Drinking Water Act maximum concentration levels (MCL).[ibid]

Plastic pipe, fittings and jointing compounds

Several plastic pipe leaching studies by credible research groups such as Stanford Research Institute[4], concluded that:

- Pipe cement solvents are initially leached at very high concentrations (methyl-ethyle ketone, carbon tetrachloride and trichloroethene);
- Low-molecular weight chlorinated organics are leached in low (1 to 10 ppb) concentrations;
- Chloroform is a possible leachate.

The report also concluded that significantly high levels of contaminants that come from plastic pipe can result from water standing in the pipe network for long periods of time. For example: in residences during vacations or even overnight (10 to 12 hours).

Part II of this series will discuss some possible solutions to plumbing-related water quality problems. ■

David Storm is a consulting civil and sanitary engineer and owner of Winters Winery.

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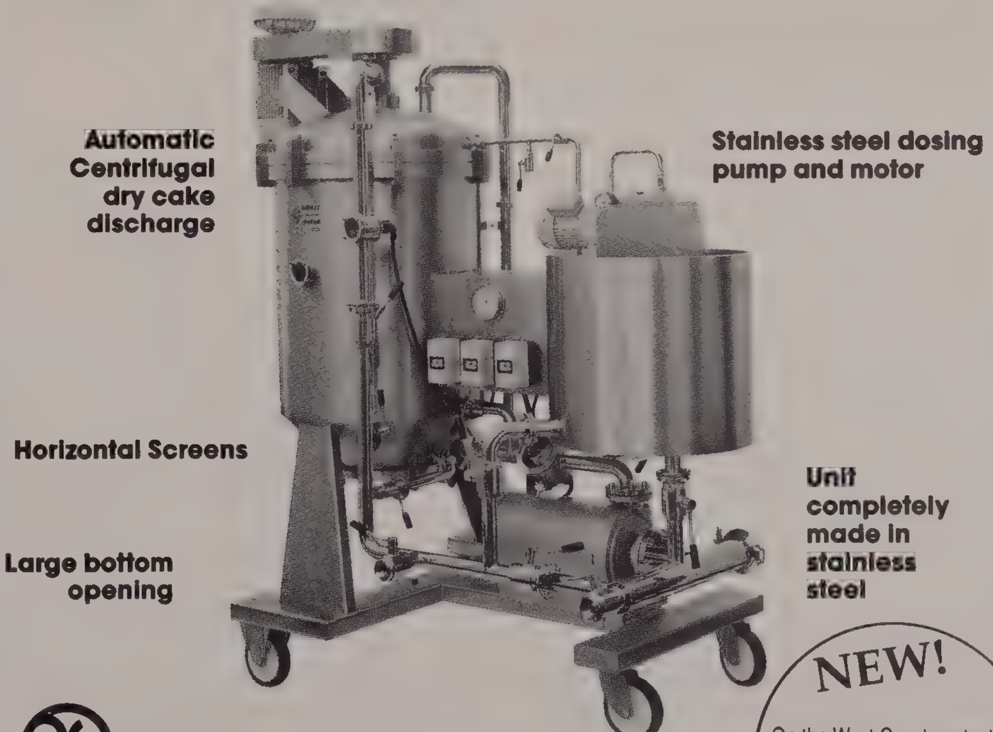
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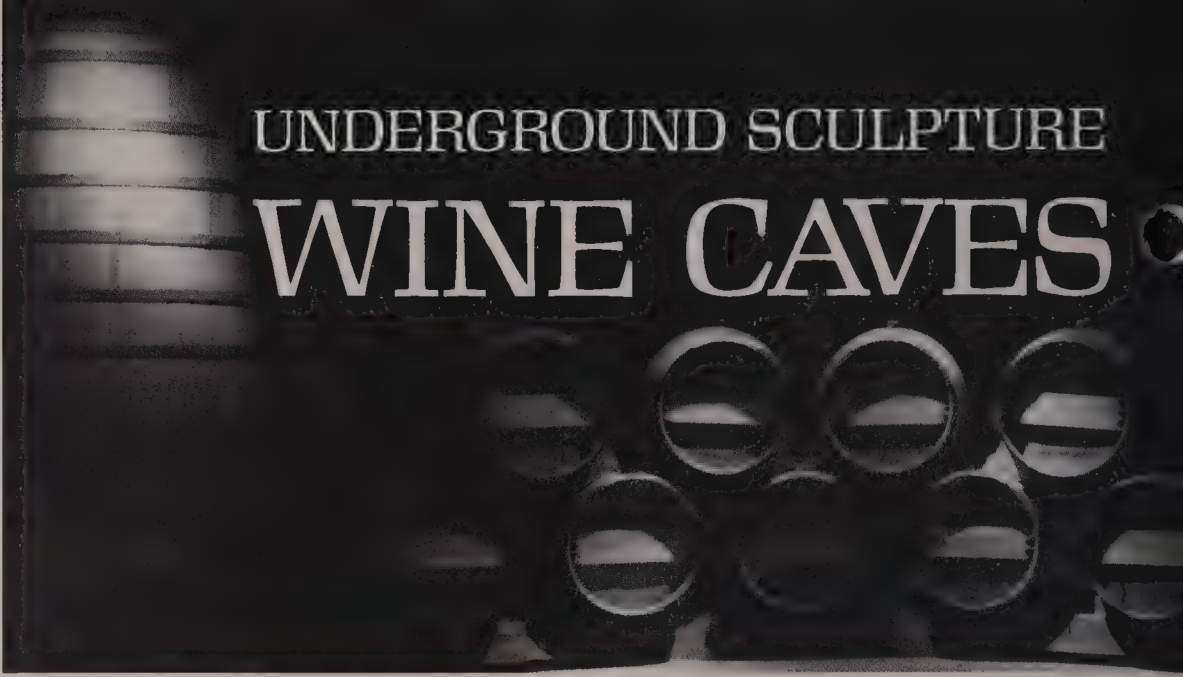
UNDERGROUND SCULPTURE
WINE CAVES

By Rhoda Stewart



Far Niente Winery

There are many practical reasons for tunneling wine caves. Consistently humid, still, dark conditions, with 58°F to 60°F temperatures, provide an ideal environment for barrel ageing of wine; barrel-fermentation of white wines such as Chardonnay and Sauvignon Blanc; bottle fermentation, ageing, and riddling of méthode champenoise sparkling wines; and storage of empty wine barrels.

There is less evaporation of wine in the still, humid cave environment — as much as one case per barrel per year — than in air-conditioned above-ground facilities. What does evaporate is mostly alcohol. Thus, vintners can pick at a higher °Brix, and produce a less alcoholic wine that still has the lush flavors of fully ripe grapes.

Caves absorb much of the heat generated in barrel fermentation of white wine. Riddling of sparkling wines is faster in caves because of the stillness. Even fly-away sediment, such as that which occurs with the Flora grape, (used by Schramsberg Vineyards in its Cremant demi-sec) settles more easily when riddled in caves. Barrels stored in caves can be left empty for several months without drying out.

In addition, since caves last practically forever, they require almost no additional expense once they are installed. Only electricity is required, for lights and equipment.

With the savings in wine due to less evaporation, the improved quality of wine because of ideal ageing conditions, and low maintenance and operating costs, caves are a practical investment for wineries with geologically suitable hillsides.

Winery owners, in close collaboration with winemakers, take great pride in designing caves to reflect their personal sense of style and design, and to fulfill entertainment needs. As a result, caves can be works of enchanting beauty, underground chambers perfectly suited to the making of great wines. Many are, in fact, finely wrought 'negative' sculptures — sculptures viewed and enjoyed from the inside.

Cave construction

Until 1987, Alf Burtleson Construction was the only wine cave contractor in California. Alf's first job, between 1972 and 1980, was the restoration of Beringer Winery's 50-year-old hand-tunneled caves, Following the Beringer restoration, Burtleson tunneled a new wine cave for Far Niente — the first new cave in California in 100 years — a 60-foot tunnel used for case storage. Burtleson has now tunneled 22 new caves for 19 clients. He has a waiting list of over two years.

The Russell Clough Co. of Napa left the civil engineering field in 1987 (after 25 years) to tunnel wine caves. Clough's first wine caves, for Pine Ridge Winery in Napa Valley were completed in 1988 (10,500 sq. ft.). From Pine Ridge, Clough went to Newton Winery in St. Helena to add 10,000 sq. ft. to Burtleson's original 6,000 sq. ft. tunneled in 1986. Clough tunneled 30,000 sq. ft. of caves for Kunde Winery, in Kenwood, Sonoma Valley in 1990. Clough has completed 8,000 sq. ft. at Stelzner Vineyards in Napa, CA.

Both contractors use an English mining machine called a 'Road Header'. Electrically-powered, it is equipped with a 20-foot arching arm fitted with a carbide-toothed boring tip. The excavated dirt is removed by a conveyor belt and 'mucker'. Fresh air is piped into the cave through a 3-foot diameter flexible tube affixed to the side of the tunnel. The machine operators guide the cutting tip with the aid of lasers and guiding marks.

Site is the first consideration when planning a cave. The cave has to fit into the winery's overall layout. "The task of the contractor," says Burtleson, "is to help the owners in achieving a design compatible with the hillside configuration and geology while meeting the practical and aesthetic needs."

Folie A'Deux Winery

Carved into a hillside beneath the winery, the cave at Folie A'Deux Winery north of St. Helena, consists of one entry tunnel and five side tunnels, a total of 3,200 sq. ft. A second entry tunnel is planned, and will connect with three of the side tunnels.

Used for barrel-ageing of both red and white wines, and for bottle ageing and riddling of a "Fantasie" sparkling wine, the Folie A'Deux cave was also designed with entertainment in mind. Although the geology wouldn't support the 'grandiose fantasies' of owners Larry and Evie Dizmang and winemaker Rick Tracy, some of their design requirements were achieved.

"We had planned for a 35-ft by 18-ft domed hospitality room at the end of the entry tunnel," said Tracy, "complete with fireplace. However, once the tunneling operator got into the hillside, he discovered the soil to be only an ancient compacted soil studded with stones. It was very soft, and the farther he went in, the softer it got. It simply couldn't support a large dome without steel reinforcement. That was too expensive; so the huge dome and the fireplace were not done."

The Dizmangs settled for a small domed intersection midway into the main tunnel, which itself curves to the right at intervals of 6°, to avoid a tubular look.

The winery's logo was created in aggregate and tinted concrete in the center of the main tunnel, and the shotcrete that lines the caves is tinted to match the handsome earth tones of the hillside soil. The logo is illuminated by a solitary spot-light. All other lighting is set into the floors at the edges of the tunnels, to reflect off the earth-toned walls and ceilings and create a soft effect. Electrical and water lines are also located in the floors of each lateral.

Wine storage is primarily in the side tunnels. The first two side tunnels are used for riddling racks and bottle storage of "Fantasie". The rear three side tunnels hold 128 barrels, four barrels wide by four barrels high.

The side tunnels slope to the center for drainage, and toward the main tunnel. The main tunnel is sloped to the sides,

and is equipped, beneath the concrete, with pipes and drainage holes over pea gravel to carry off excess moisture.

The overall cost of the cave came to approximately $60/sq. ft.

The Folie A'Deux caves, completed in 1988, are the first stage of a plan to greatly expand the winery. A building to house the winery operation will soon be constructed at the mouth of the cave. Grapes will be crushed at the existing winery site, then gravity-fed to tanks below, and from the tanks to barrels in the caves. Plans also include a 9,000 sq. ft. deck above the caves, for entertainment.

"Although constructing wine caves takes more time and thought than you might possibly imagine," emphasizes Tracy, "that is, unless you have perfect rock formation, they provide perfect conditions for making wine, and offer distinctive aesthetics — so they are a practical investment."

White Rock Vineyards

White Rock Vineyards, owned by Henri and Claire Vandendriessche in Soda Canyon (Napa Valley), has 6,000 sq. ft. of caves tunneled out of bare rock in 1988. Before tunneling, Alf Burtleson excavated a broad patio-like area in front of what would be the cave entrance. The result is a sheer white rock face into which are set four huge redwood doors to the two cave entrances.

The broad patio area that fronts the entire width of the cave site provides space for the winery's crush operation at one end and the winery office/lab at the other. The space between is graced by a long, curved solid rock bench created by the machine operator.

The cave consists of two 100-ft. long main tunnels and two cross tunnels. Because White Rock Vineyards does not have a winery building, there are two 20-ft. wide chambers at the entrance of each of the two tunnels to house all winemaking operations, except for crushing and pressing. There are two fermentation tanks in each chamber of the north tunnel. The two chambers in the south tunnel are used for bottling.

Barrels for ageing Cabernet Sauvignon and Chardonnay occupy the centers of the cross tunnels. Carved into the walls of the cross tunnels are intricate 4-ft.× 8-ft.×8-ft. alcoves used for bottle ageing.

The tunnels are equipped with trench drains over 2-inch slotted PVC pipe down the centers of the tunnels, and covered with grates. The cross tunnels slope at 1.5% to the entrance tunnels, which slope 1.5% to the doors.

Although the texture of the bare rock walls had great beauty, it was of a fractured composition given to shedding. Therefore the caves were lined with two inches of shotcrete. The owners, with Burtleson's assistance, sprayed on an additional ½-inch coat of apricot-tinted white shotcrete containing 'Thoro-Seal', a water-proofing product. The resulting effect is a south-western look.

White Rock Vineyards first produced 1,000 cases of wine in 1988 and the caves allow for tripling this volume.

Far Niente

The 15,000 sq. feet of caves completed in 1989 at Far Niente in Oakville, are sculpted with artistic precision into graceful horseshoe-shaped arches beneath the winery offices. Because of landscape requirements surrounding above-ground facilities, the caves had to be thoroughly sealed against moisture. This required two 2-inch layers of white shotcrete with a layer of crystalline 'xypex' in between, amounting to a 4-inch lining throughout the caves. As winter rains drench the hillside and seep through to the xypex, it expands with the moisture to gradually form a water-tight seal.

Far Niente's caves are designed around a pair of 12-ft.×12-ft. tunnels that intersect at right angles to form a central axis. The main tunnel is 100-ft. long and connects the original 60-ft. case storage cave and winery to a set of steps leading to an outside garden, forming the central tunnel of the cave layout.

The intersecting tunnel is 60-ft. long, and connects the lower level of the carriage house, which now is used for bottling, to the central tunnel, at which point the caves expand into a round room 30-ft. in diameter by 18-ft. high. Opposite this round room is a room for oak tanks that is 50-ft. long×24-ft. wide×15-ft. high. The winery's logo is set into the floor of this round room intersection.

One distinctive feature of the Far Niente caves is a 25-ft. diameter by 17-ft. high octagonal wine library with a limestone floor, wrought iron wine racks, a cornice, and a wrought iron gate. Stone columns will be added.

The caves are also equipped with three 12-ft.×12-ft.×20-ft. equipment closets. The floors of all tunnels are set with channel drains a barrel's length from the wall. The barrels rest on custom-made concrete supports.

Walls of the tunnels are enhanced with recessed window-like arches that contain recessed lighting with controls for adjustable illumination. The ceilings are also equipped with recessed lighting, so that only light, and not the fixtures, is visible.

Intricate in design and execution by any standards, the first requirement Far Niente's caves had to meet was to provide usable space for winemaking. Then, architectural and aesthetic possibilities were considered. "It should cost only slightly more to construct aesthetically pleasing caves," suggests Dirk Hampson, winemaker.

Towards achieving this double goal, the caves have been fitted with invisible plumbing that includes extra conduits for each of the services, and uniformity, precision, and polish in all of the visible details.

"Caves last forever," Hampson added. "So all details should be done as close to perfection as possible. And future winemaking needs should also be anticipated as best as possible, since change is almost impossible once the concrete is laid. A sense of timelessness is important."

The caves are plumbed for hot and cold water, compressed air and nitrogen. To supply glycol to the two large tank rooms, the heaviest available copper tubing, with all joints silver-soldered, was used. Every joint in the elaborate electrical system is silicon-glued.

Cost of Far Niente caves was approximately $100/sq. ft.

Pine Ridge Winery

"Nuances and angles of surprise," is how Gary Andrus of Pine Ridge Winery in Napa Valley, describes the 10,500 sq. ft. of caves tunneled by Russell Clough Construction. Completed in 1989, the caves consist of two entrance tunnels leading from the winery building, a third dead-end tunnel parallel to these two main tunnels, and two angled cross tunnels.

The first entrance tunnel leading from the tasting room is 160-ft. long. The second entrance tunnel leading from the winery building is 210-ft. long. At the end of this tunnel is a 14-ft. high×18-ft. wide×45-ft. long entertainment tunnel.

The open spaces created by the many angled intersections are enhanced with spittoons, vases, and other art work. Only Chateau barrels adorn the entertainment room.

Barrels are stacked along the sides of the tunnels, leaving a walk-way down the center. Beneath the barrels is gravel on top of earth, as a means of maintaining the highest possible humidity. The walkways are concrete.

Carbide-toothed boring tip of machine excavating a cave.

The caves are completely lined with fibre shotcrete, which follows the natural contours. No attempt was made to camouflage irregularities caused by the rock formation.

When planning the caves, Andrus wanted to take advantage of the aesthetic value and the practical value to improved wine quality at less cost. "We are always in the process of selling by allowing visitors to taste wine from the barrels," said Andrus.

Pine Ridge Winery offers tours by appointment six days/week. The winery is equipped with both a public and private tasting room. The private tasting room leads into the caves, where guests are treated to barrel tastings and the option of buying wine futures.

Designed to create for visitors the ambience of a small winery, Pine Ridge has used the caves as a way of providing a memorable winery style and personality, as an important step towards making the wines memorable. The daily activities of the winery occur in and behind the winery buildings, so that the guests see only the tasting room and artistically enhanced caves.

Newton Vineyard

The distinguishing feature of Clough Construction's cave for Newton Vineyard, St. Helena, is the 25-ft. wide×15-ft. high tank room directly below the winery. A 50-ft. tall×8-ft. diameter shaft connects the winery to this tank room, and is used to gravity-feed wine to a holding tank. The holding tank itself sits on a shelf 10-ft. above the cave floor.

The caves consist of two entrance tunnels 12-ft.×12-ft.×300-ft., together with a couple of dead-end spurs, for a total of about 800 linear feet. The caves, which were carved out of highly fractured franciscan rock, are entirely lined with shotcrete. The floors are concrete, and are equipped with channel drains.

Kunde Winery

Clough has tunneled 30,000 sq. ft. of caves for the new Kunde Winery, Kenwood. The cave consists of two entrance tunnels, and four cross tunnels set at 60° angles to the entrance tunnels. One entrance tunnel originates behind the winery, and will be equipped with work stations, floor drains, and underpipes at the intersections. The second entrance tunnel originates near the parking lot, and will be the visitors' entrance.

The cross tunnels originate at the visitors' tunnel, intersect the winery tunnel, then angle at an additional 70° to continue for another 230 feet, where they will connect to a third dead-end tunnel set parallel to the two entrance tunnels.

In anticipation of expanded winemaking operations in the caves, they will be equipped with one pair of glycol lines besides the basic services of water, nitrogen, and electricity.

The caves will be illuminated with fluorescent lighting in pairs.

As with many of the winery owners who have had caves installed recently, Kunde recognizes both the storage value of caves to fine wines and their aesthetic value. "Aesthetics," said David Noyes, winemaker, "are a prime consideration for us."

Cave plans include a 12-ft. high×14-ft. wide×56-ft. long entertainment gallery with a stage area to be lined with bottle racks. The gallery is at the end of the visitors' entrance tunnel, and will be approached by walking up three steps.

Production is expected to be 30,000 cases for the first vintage — 60% white and 40% red. Within 10 years, production is anticipated to be 120,000 cases, with 40% white, and 60% red. The wines will be estate, as the ranch has 600 planted acres with 400 more to plant.

Rutherford Hill

In 1984, 2,700 linear feet of caves to store 6,533 barrels of wine were tunneled at Rutherford Hill winery, St. Helena, CA. Alf Burtleson has dug another 480 linear feet to accommodate about 1,400 more barrels in 1990. A 39-ft. long×20-ft. wide ×14-ft. high domed dining room was also created in 1990 along with access corridors. The dining room has radiant heating in the floor and recessed lighting in the ceiling.

Construction details

Angled tunnels are something of a trademark of Russell Clough Construction, as his Roadheader is equipped with a long rear conveyor belt, which gives greater 'mucking' capacity but less maneuverability. His mucker holds five cubic yards of dirt, which means shorter idle time each time it leaves the cave to empty. However, the larger capacity belt makes maneuvering for sharper angles a somewhat slow process.

The trade-off, however, is an opportunity for winery owners to develop aesthetics around the 60° to 130° angled intersections. These angles also provide additional ease of operations within the tunnels. Clough's personal philosophy is that the longest, straightest tunnels are the cheapest and the safest.

Since mining his first wine caves in 1985, Alf Burtleson feels he now better understands the importance of gauging winery clients' needs, and how to fulfill these needs. "Winery owners and winemakers are creative people," says Burtleson. He finds working with them to install caves that reflect these creative visions to be an exciting endeavor.

Both Burtleson and Clough determine cost on a unit basis: *e.g.*, excavation, shotcrete, arch size. Soil type (whether Sonoma Volcanic or Franciscan) largely determines excavation and shotcrete costs; it may also affect arch shape and size.

Both contractors also have on-site job equipment for shotcrete. This enables them to keep on hand white concrete — something cement contractors don't often have immediately available, because it is expensive — and to customize tints.

Wine caves are not only growing in popularity for their practical value; their aesthetics are also becoming widely appreciated and valued.

"People react to caves," said Dirk Hampson. "They have an effect on everyone; they touch an emotional cord." ■

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INFLUENCE OF ENVIRONMENT

Wine evaporation from barrels

By Richard M. Blazer, Enologist
Sterling Vineyards
Calistoga, CA

Sterling Vineyards stores barrels of wine in both an air-conditioned, unheated, unhumidified building (chai) and a cave (capacity: 4,000 barrels), in which there are no mechanical means to affect the environment.

An experiment was designed to quantify differences in topping wine volume and costs between the chai and the cave. Twenty barrels containing 1988 Sterling Reserve (a red Bordeaux variety blend) were stored in each location and monitored for 50 weeks.

The barrels employed were 225-L, 1988 Seguin Moreau, Allier forest origin, château ferré style, medium+ toast, and approximately 20-mm thick staves. The barrels had been used previously for Chardonnay fermentation and ageing from September 1988 until April 1989, when they were filled with the Reserve blend.

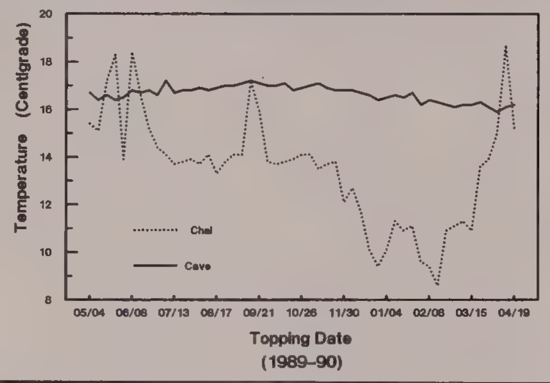
In order to study the effects of environmental factors on evaporative loss from barrels, temperature and relative humidity (sling psychrometer) were measured weekly, and the barrels were topped every five weeks with a graduated cylinder.

White Livingston atmometers were utilized to study the evaporative power of the air. These atmometers consist of a hollow porous porcelain sphere 5-cm in diameter, which is filled with water and mounted on a water reservoir bottle. Since the rate of water loss from the porcelain surface is affected by air movement, humidity and temperature, the true evaporative power of the air can be measured.

Results

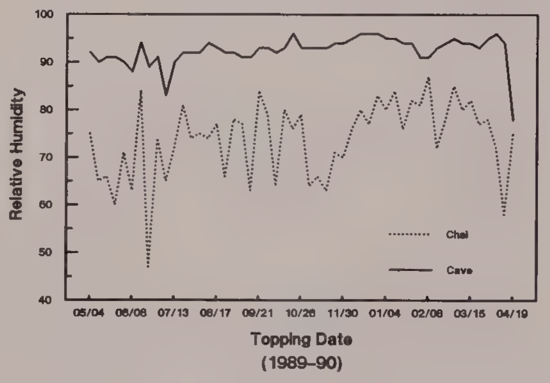
Figures 1 and 2 show the temperature

Figure 1



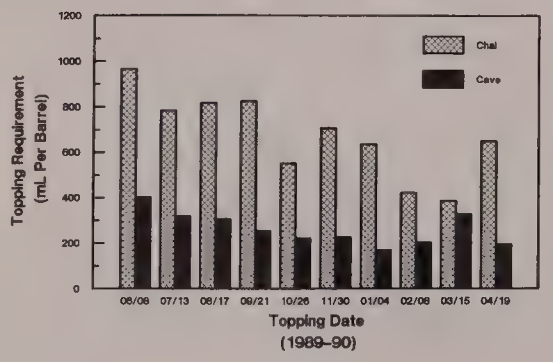
TEMPERATURE

Figure 2



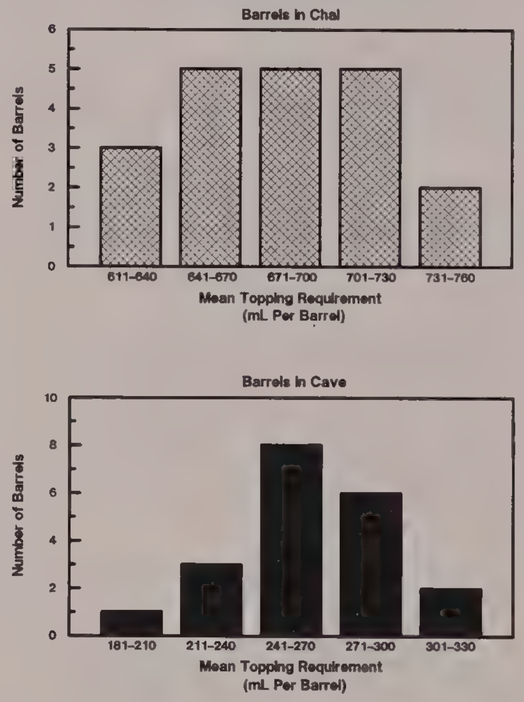
RELATIVE HUMIDITY

Figure 3



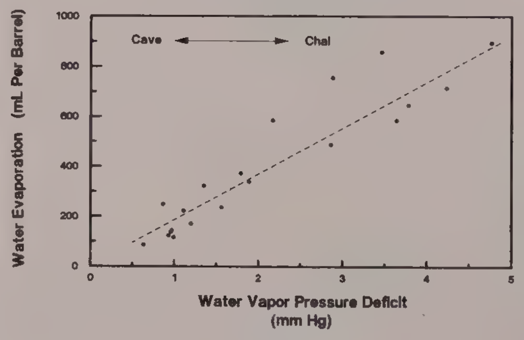
TOPPING REQUIREMENT

Figure 4



BARREL VARIATION

Figure 5



WATER EVAPORATION VS. VAPOR PRESSURE DEFICIT and relative humidity data, respectively, for the two barrel storage locations. The conditions in the cave were very uniform while the chai temperature dropped during the unregulated winter period. Sudden decreases in cave relative humidity in July 1989 and April 1990 were caused by the entrance being open for extended periods.

Relative humidity in the chai showed large weekly fluctuations, presumably due to both atmospheric humidity changes and dehumidification by the air conditioning.

Dehumidification is a function of both the amount of time the air conditioner operates and the glycol temperature in the air conditioner. The mean temperatures and relative humidities for the chai and cave were 13.5°C (56.3°F) / 73.8% and 16.7°C (62.1°F)/ 92.5%, respectively. Atmometers, placed in both sheltered and exposed locations from mid-head to bung-high among bottom-row barrels, revealed only very small differences in evaporativity within a group of barrels.

Temperature variations from one topping to the next cause expansion or contraction of the wine, which can result in major aberrations in the apparent evaporative wine losses. All topping volumes, therefore, were corrected for expansion / contraction of the wine.

The volume coefficient of expansion of the wine was determined by weighing a wine-filled volumetric flask at several temperatures. A typical value of the volume coefficient of expansion of the wine, which is a function of temperature, is 0.024°C at 15°C (0.013°F at 59°F). This corresponds to 54 mL/°C (30mL/°F for a 225-L barrel). Expansion / contraction of the barrel itself was shown to be negligible.

Fig. 3 shows the topping requirements, corrected for expansion / contraction, for all five-week toppings. Each bar in Fig. 3 represents the mean volume needed for each 20-barrel lot.

At each topping, significantly more wine was required to top barrels in the chai. This observation was confirmed by t-tests (all $p < 0.001$). The ratio of the mean topping requirement for the **entire** 50-week period for the chai to that for the cave was 2.61.

The mean topping wine used was 6.82-L/barrel per year (3.03) in the chai and 2.61-L/barrel per year (1.16) in the cave. The difference between these percentages can be used to determine the monetary savings resulting from lower wine loss in the cave.

For instance, this difference amounts to nearly 1/2-case of wine per barrel per year, which translates to about $1,700 per 1,000 cases at a wholesale price of $7.50/bottle.

Two-way analyses of variance of the topping requirement data, corrected for expansion / contraction, for each location show significant variations ($p < 0.001$) for both topping means and barrel means. This demonstrates both the effect of seasonal environmental changes and barrel-to-barrel variation.

Fig. 4 shows the frequency distributions of the mean barrel topping requirements. The need for a large sample size for barrel experiments is evident from the large variability observed.

Although evaporative losses of wine do correlate to some extent with relative humidity alone, evaporation is also a function of temperature, air speed, and other factors. While the effect of many of the factors can be very complex, the evaporation rate of water should be proportional to its vapor pressure deficit, which is a function of relative humidity and indirectly of temperature.

When water and air temperatures are equal and surface and boundary effects are negligible:

$$\text{Vapor Pressure Deficit} = p \times [1 - (\text{RH\%}/100)]$$

where p is the vapor pressure of water at ambient temperature. Since no appreciable concentration of ethanol exists in the air, the vapor pressure deficit for pure ethanol is simply the vapor pressure of ethanol.

An estimate of the volume of ethanol that evaporated during each topping interval can be generated from overall topping needs, composition changes as determined by ethanol analyses, mean temperatures for the topping intervals, and vapor pressures of ethanol at those temperatures.

If the ethanol volumes are subtracted from the total volumes, water evaporation can be determined. Fig. 5 shows water evaporation as a function of water vapor pressure deficit.

Three outliers are evident. The excessive evaporation for the two at higher vapor pressure deficit, which correspond to the chai in the middle of the summer, can be explained by increased evaporation caused by significant air movement from the nearly constantly operating air conditioner. The least squares line for all data except these two mid-summer outliers ($R=+0.96$) is shown.

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The fact that water loss correlates well with the water vapor pressure deficit allows the evaporative loss from barrels to be estimated at various relative humidities and temperatures (Table I).

Estimated alcohol losses have been added in to give total wine loss per annum. The data only applies to conditions similar to Sterling's: table wines stored in tight-grained, 225-L, château (thin-stave) barrels in non-windy areas, etc.

Even under quite different conditions, Table I should give a good idea of the effects of the environmental parameters. For example, the evaporation rate at 16.0°C (60.8°F) / 55% RH should be about twice that at 13.5°C (56.3°F) / 75% RH.

Atmometers, which were placed in the chai and cave at mid-head height between bottom-row barrels, were weighed at the beginning and end of two topping intervals. The rate of water evaporation per unit surface area was much greater for atmometers than for barrels. The ratio of loss per unit surface area ranged from 36 in the cave, for a period when doors were always closed to 105 in the chai for a period in which the air conditioner was operating often.

This leads to the conclusion that the loss from barrels is slowed greatly by the need for the wine to migrate through the wood. The variation in ratios indicates that evaporation from the atmometer surface is more sensitive to air movement than barrel surfaces.

Ethanol changes

Ethanol analyses by gas chromatography were performed on the wine initially (12.95 volume) and on 20 barrel composites at the end of the 50-week experiment. The final levels were 12.74% in the cave (a drop of 0.21) and 13.06% in the chai (a gain of 0.11).

The above data implies that the relative humidity balance point at which a table wine doesn't change in ethanol concentration due to evaporation is greater than 74%, the overall mean for the relative humidity in the chai. This inference is consistent with some data from J.F. Guymon, but not with the 60 to 65% level reported elsewhere.

Conclusions

The evaporation rate of wine from barrels in the air-conditioned chai was 2.61× the rate in the humid cave. Although the rate of wine loss from barrels depends on many factors, water loss correlates well with the water vapor pressure deficit. This observation allows evaporative loss from barrels to be estimated at various relative humidities and temperatures.

Atmometry showed that migration of wine through wood is slow compared to evaporation. The relative humidity balance point at which wine does not change in ethanol content appears to be greater than 74%. Above this balance point, ethanol concentration will decrease with time, while below the balance point, the concentration will increase.

While barrel storage under dry conditions has the undesirable effect (especially if near 14%) of raising the ethanol concentration, it provides the benefit of concentrating aromas and flavors somewhat. Barrel storage under high humidity conditions, however, allows fruit to be picked later with riper flavors; the resulting, higher alcohol wines will then lose some of the alcohol during storage. ■

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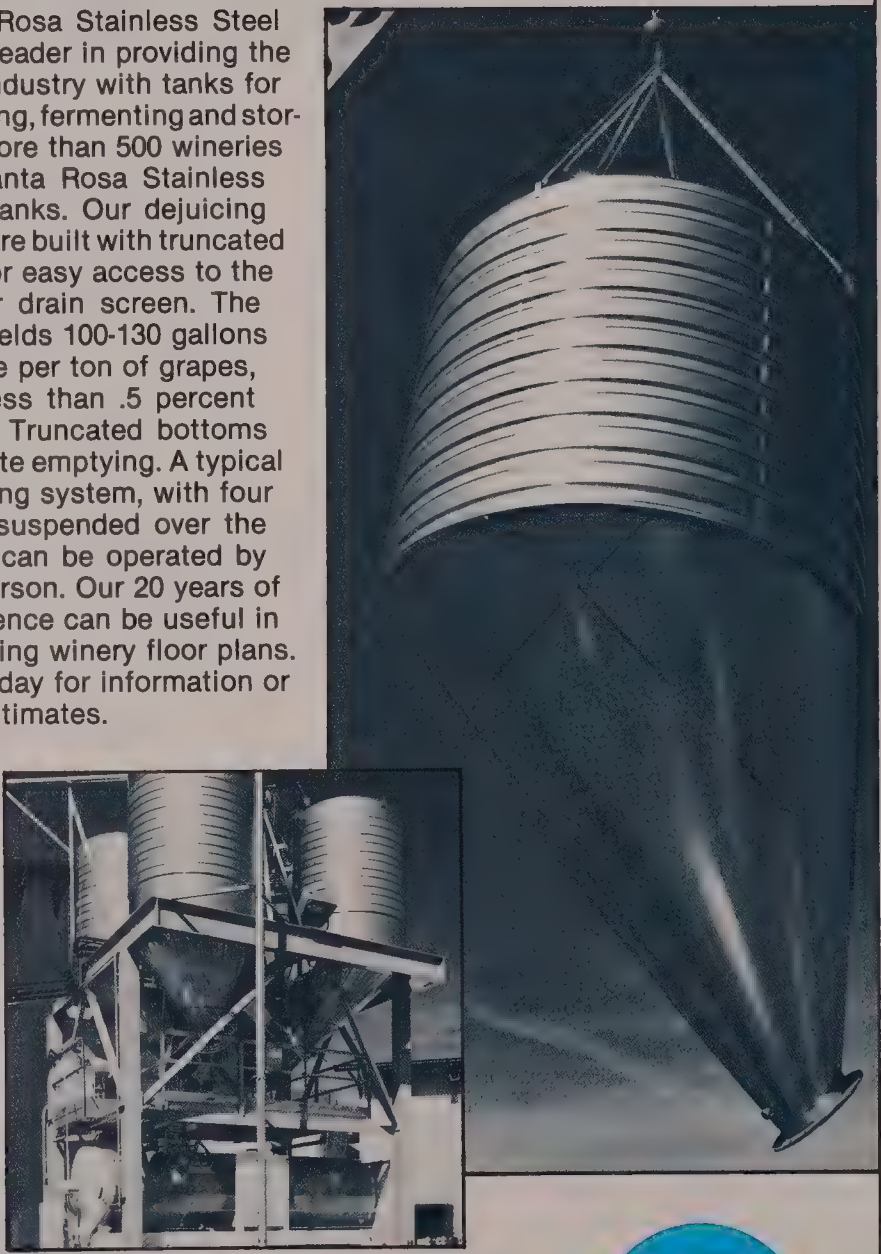

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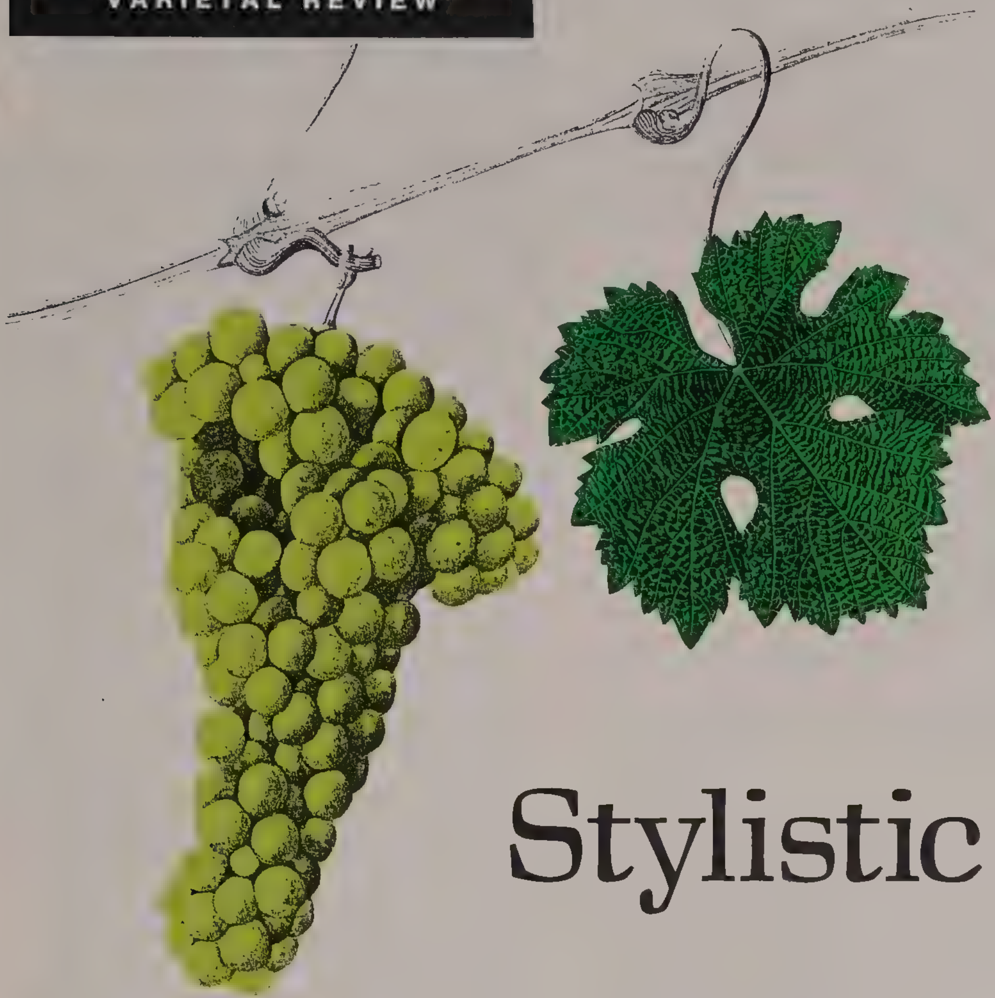


Chenin Blanc

Stylistic similarities

By Eleanor & Ray Heald

With Chenin blanc, the dominant white grape variety of the lower Loire Valley in France, the question is: Can this varietal distinguish itself in a Chardonnay-driven wine market?

Chenin blanc produces the characteristically soft, off-dry French Vouvray, an ever-popular white wine with steady sales. It also produces the white wines of Anjou, a region of the Loire. In the last decade, changes in taste have persuaded many Anjou producers to vinify a drier style of Chenin blanc.

French Chenin blanc producers speak of a 'Chenin style', and the eclectic palate can find great similarity between a Vouvray and an Anjou white.

Chenin blanc is also grown throughout California and in Washington State. The wines tasted in a recent **PWV** tasting were, in the main, indicative of the variety rather than the region where they were grown. It was interesting to discover however, the differences among the various producers.

Perhaps a marketing effort stressing Chenin blanc's varietal consistency would encourage consumers to try this value-priced white wine. The other 'blanc', with its style variations and two names (Sauvignon and Fume), has the consumer confused and perhaps turned off.

While Chardonnay sales increase, some people in the wine industry believe people are looking to other varieties — and that Chenin can deliver. There's no proof of this in the marketplace now, but it could be an interesting marketing angle should some wineries get it going!

Among the vine roots

In the Loire Valley, the best Chenin blanc vineyards have chalky soil. At Callaway Vineyards in Temecula, CA, soils are decomposed granite, with approximately a 20-foot deep root zone. Chappellet's vineyard, in Rutherford, CA, is gravelly, rocky loam with some clay layers.

Chateau Ste. Michelle's River Ridge Vineyard in the Columbia Valley AVA, at Paterson, WA, is sandy-loam with a fractured basalt substrata.

About ⅓ of the Dry Creek Vineyard (Healdsburg, CA) Chenin Blanc grapes come from sandy-loam soils in the Dry Creek Valley. The remainder of the grapes are purchased from Clarksburg, CA (Sacramento Delta) growers.

Grand Cru Vineyards, Glen Ellen, CA, and Hacienda Wine Cellars, Sonoma, CA, also buy fruit from Clarksburg area growers. "I've never seen a rock in these deep, alluvial, river-bottom soil vineyards," remarks Perry Cook, Grand Cru's Chenin blanc grower.

Alluvial loam and clay-loam are the dominant components of Pine Ridge Winery's vineyards in Yountville, CA.

Five independent growers in the St. Helena and Rutherford area supply grapes to Girard Winery. "When the soils are deep and a heavy canopy has developed, September rains, as in 1989, can create a botrytis rot problem," reports winemaker Mark Smith.

Sandy-loam soils with intermittent calcareous lime layers two- to six-feet deep characterize the Kiona vineyard in the Yakima Valley, WA.

The Monterey Vineyard, in Gonzales, CA, sources grapes from Lockwood sandy-loam soils at the Paris Valley Ranch in San Lucas.

Generally deep and fertile vineyard soil conditions in Lake County, Yolo County, and Monterey County supply grapes for Sutter Home Chenin blanc.

Grapegrowing

Vineyards for all producers interviewed are located in UC Davis Regions II and III. Some Sutter Home vineyards are in Region IV.

Kiona Winery uses grapes from vines less than ten years old. Chappellet, Girard, and Grand Cru all pick from 20-year-old vines. Average vine age is 14 years.

Vineyards managed with a bilateral cordon system and one or two-wire vertical trellising supply grapes to Dry Creek, Girard, Grand Cru, Hacienda, Kiona, Monterey Vineyard, and Sutter Home.

The 'T'-trellis with a bilateral cordon is used by Chappellet and Chateau Ste. Michelle. Pine Ridge uses both a cane and cordon system.

On average, these systems are pruned to 30 to 36 buds/vine, and these canopies rarely require manipulation. On occasion, early season shoot-thinning or post-set leaf-pulling is done.

Only Callaway Vineyard picks fruit from a Geneva Double Curtain (GDC) system. The GDC is pruned to 25 to 28 buds, two buds/spur. The cordons are four feet apart.

Crop levels vary significantly among the vineyards. Chappellet gets three tons/acre and Sutter Home achieves up to ten tons/acre. However, some of Sutter Home's vineyards yield only four tons/acre, so the average is seven tons/acre.

Doctor, Doctor!

Viticultural problems appear to be site-specific. Dwayne Helmuth, winemaker at Callaway, and Pine Ridge winemaker Stacy Clark report leaf hopper problems in some growing seasons.

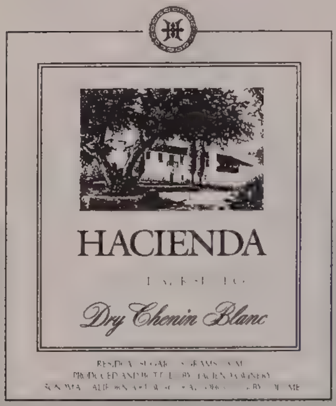
Philip Titus, winemaker at Chappellet, cites oak-root fungus.

Eutypa is a problem for Chappellet and suppliers to Dry Creek, Grand Cru, and Hacienda.

Winemaker Larry Levin at Dry Creek cites phylloxera problems on older vines; this is also reported by Grand Cru and Hacienda.

Jim Holmes at Kiona Vineyards explains that February sub-zero temperatures reduce fruitbud viability. Similar problems are experienced at Chateau Ste. Michelle.

Monterey Vineyard winemaker Phil Franscioni reports latent, non-fruitful shoot growth.



Picking criteria

"At Pine Ridge, we'll pick Chenin as low as 18° Brix and no higher than 20° Brix," says Stacy Clark. Aiming for 20° Brix are Dry Creek, Hacienda, Kiona, and Chateau Ste. Michelle.

Picking slightly riper, at 21° to 21.5° Brix, are Callaway, Girard, Grand Cru, Monterey Vineyard, and Sutter Home.

Riper fruit, up to 22° Brix, is Chappellet's preference.

Grand Cru's harvest goal is 0.70 g/100mL TA, but will accept as low as 0.6 to as high as 0.90. Also low, at 0.70, 0.75, and 0.76 respectively, are Girard, Chappellet, and Monterey Vineyard.

Washington State's Chateau Ste. Michelle and Kiona obtain TAs around 0.90. Pine Ridge is the highest, at 0.95 to 1.0.

The range of pH overall is 3.0 to 3.5 with an average pH of 3.2.

Stylistic goals

Helmuth describes the Callaway style as "fresh, young, and delicate, with abundant fruit aromas and flavors achieved by early morning harvesting of grapes and cold fermentation temperatures."

"Barrel fermentation and barrel ageing portions of the wine adds an element of richness and complexity to the Chappellet Chenin," contends Titus. "This style can be enjoyed young, but will improve with age over a decade."

Chateau Ste. Michelle strives for a clean, fruity, crisp, aperitif wine.

"Dry, no oak, cold, stainless-fermented to preserve delicate fruitiness is the Dry Creek aim," Levin maintains.

"We strive to balance the fruitiness of the Chenin blanc grape with the depth and complexity obtained through 10% barrel fermentation," states Mark Smith at Girard. "We make the wine in a dry style that is both crisp and full on the palate. Additional complexity is added by ageing the wine in small French oak barrels."

Grand Cru's goal is to produce a fresh, balanced, off-dry (0.86% R.S.) food wine that accentuates varietal character.

"At Hacienda, we're striving for a wine that balances the grape's delicate varietal character with the fermentation bouquet," says winemaker Eric Laumann.

"An off-dry (2% R.S.) food wine is our style," asserts Jim Holmes at Kiona. "We want it balanced so that it is perceived as dry on the palate."

"At Monterey Vineyard, we want a moderate fruit level Chenin blanc," Franscioni states. "It's produced off-dry (1.7% R.S.) with a good sugar/acid (0.78 TA) balance.

Low alcohol (10%), delicate and fruity is the Pine Ridge style. "The slight residual sugar (1.4%) brings up the fruitiness that is promised in the nose," contends Clark.

"The Sutter Home style of Chenin blanc complements our white wine marketing efforts," says winemaker Steve Bertolucci. "Our Sauvignon blanc is dry, the Chenin blanc is 4% R.S., and the Muscat is 8% R.S.

"Residual sugar is maintained with a fairly high total acidity (0.8) and low pH (3.3). This wine falls perfectly between the characteristics of our Sauvignon blanc and Muscat of Alexandria. Our aim is to provide consumers with a wine that has luscious, mouthfilling qualities followed by the crisp edge of natural acidity."

Winemaking

All producers interviewed except Chappellet, Girard, and Monterey Vineyard, employ a 'bottle to throttle', totally stainless steel production method.

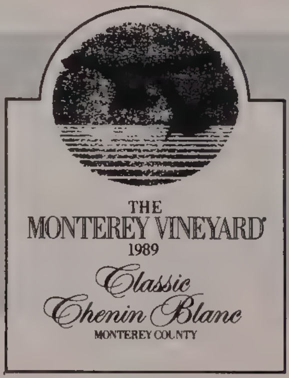
Acidulation of the must to the range of 0.80 to 0.85 TA is commonly practiced.

Pre-fermentation SO_2 addition of 25 ppm is made at Chappellet. Callaway, Dry Creek, and Grand Cru add 30 ppm SO_2. Additions of 40 ppm are made at Girard and Sutter Home. Monterey Vineyard adds 50 ppm at the crusher.

Initial SO_2 additions, post-fermentation, of 30 ppm are made at Kiona and Pine Ridge. Chateau Ste. Michelle and Hacienda add 50 ppm.

Yeast inoculum levels, on average, are 1-lb to 2-lb/1,000-gal.

PREMIUM SELECTION
Grand Cru
VINEYARDS
1989
CLARKSBURG
DRY CHENIN BLANC
Produced and Bottled by Grand Cru Vineyards Glen Ellen California USA Alcohol 11.5% by Volume



SUTTER
HOME
1989 CALIFORNIA
CHENIN BLANC
VINTED AND BOTTLED BY SUTTER HOME WINERY
ST HELENA NAPA COUNTY, CALIFORNIA 94574
ALCOHOL 10% BY VOLUME CONTAINS SULFITES

Prise de Mousse is the choice of yeast at Callaway, Chappellet, and Dry Creek. Epernay II is used at Chateau Ste. Michelle, Girard, Kiona, and Monterey Vineyard.

Grand Cru used Lallemande Champagne yeast in 1989 and Sutter Home ferments with California Champagne yeast.

At Pine Ridge, most of the blend is fermented to dryness using Steinberg yeast. "This enables us to aerate the dry wine to help develop aromas and flavors," states Clark. About 40% is fermented with UCD#594. "We call this our fruit salad yeast," adds Clark. "It produces distinct tropical fruit aromas and taste."

A portion of the Pine Ridge lot fermented with UCD #594 is stopped from completing fermentation and is used as a sweet *muté* with about 5% to 6% R.S. and 5% to 6% alcohol. The sweet *muté* is blended back with the other two lots to create a style that is slightly off-dry.

For complexity, Hacienda blends three different lots. Each is fermented with a different yeast: Prise de Mousse, Epernay, or Steinberg. "The Prise de Mousse always ferments dry and clean even at temperatures below 45°F," Laumann contends. "Steinberg and Epernay are slow-fermenting yeasts and often have trouble finishing fermentation. However, the two less aggressive yeasts produce an array of fruit flavors."

Diammonium phosphate is commonly added as a yeast nutrient to avoid H_2S problems, especially when Epernay yeast is used.

Tank fermentation temperatures range from a low of 40°F to 45°F at Pine Ridge and Callaway to a high of 62°F at Monterey Vineyard. The average fermentation temperature is 50°F.

At both Dry Creek and Hacienda, the wine in tank is kept on the yeast lees for four to six weeks past dryness.

Bentonite fining for protein stability is commonly practiced. Many winemakers do not see any reason for juice fining of this variety, but Lindblom has found it beneficial at 3.5-lbs/1,000-gal.

Use of oak

At Chappellet, 25% of the wine is fermented at 60°F to 65°F in three to five-year-old, 60-gal, French oak barrels. Fifty percent of the wine is barrel-aged for three months. SO_2 levels are maintained at 20 ppm free and 70 ppm total.

At Girard Winery, 15% of the wine is barrel-fermented and/or barrel-aged in two-year-old, 60-gal French oak. The barrel-fermented lots see a total of six months in barrel with two months of lees contact. During the ageing, SO_2 is maintained at 20 ppm free and 60 ppm total.

A blend of medium and heavy toasted French oak chips are added to the fermenter at the onset at Monterey Vineyard. After fermentation, the tank is topped and left *sur lie* on the yeast lees and oak chips for ten weeks.

Points of reference

A winemaking discussion following the tasting revealed the following concerns: "Minimal skin contact is very important for Chenin blanc," contends Lindblom. "I attempt a three hour maximum. However, it's only beneficial if done cool, *i.e.* 50°F."

All winemakers agreed that CO_2 levels in the bottle should be carefully monitored because some consumers don't like the palate impression left by CO_2. During the tasting, it was noted that some winemakers were bothered by detectable concentrations of CO_2 while others thought it added a dimension of freshness.

Producers of large volumes of Chenin blanc stress the value of adding back *muté* to rejuvenate the wine as various lots are blended for bottling.

Tasting Notes

PWV thanks Girard Winery for hosting the Chenin Blanc tasting and the following winemakers who participated in the tasting: Dwayne Helmuth, Callaway Vineyard & Winery; Phillip Titus, Chappellet Winery; Larry Levin, Dry Creek Vineyard; Steve Girard and Mark Smith, Girard Winery; Barbara Lindblom, Grand Cru Vineyards; Eric Laumann, Hacienda Wine Cellars; Stacy Clark, Pine Ridge Winery; Steve Bertolucci, Sutter Home Winery.

1989 Callaway Vineyard & Winery Morning Harvest, 0.65% R.S.

Color/Aroma: Very pale. Melony, light floral, ripe honeydew, hazelnut, tropical fruit, estery, pineapple.

Flavors: Fig-like, melony, pears, tropical fruit, citrusy, peaches, apricots, green apple.

Balance/Finish: Good body, silky entry, delicate style, soft, slight spritz; slightly sweet, but good acid balance.

1989 Girard Winery, 0.70% R.S.

Color/Aroma: Light lemon-yellow. Figs, pears, honey, hints of vanilla, honeysuckle, baked apple, dill.

Flavors: Citrus, honeydew, honey, tropical fruit, peaches, pears, hints of spice.

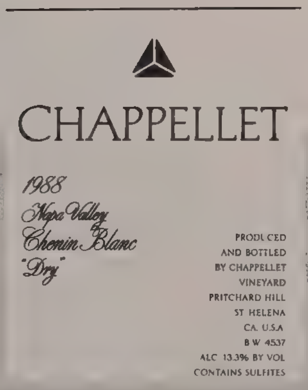
Balance/Finish: Crisp, good body, sweet but refreshing, lively, good intensity, lingering aftertaste.

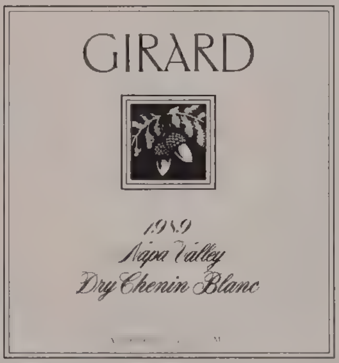
1988 Chappellet Winery, 0.15% R.S.

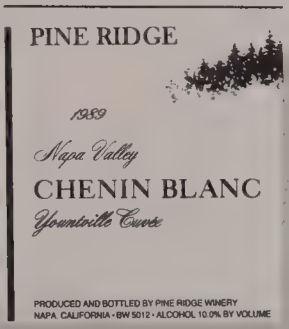
Color/Aroma: Lemon yellow. Cantaloupe, melon, yeasty, pears, baked apples, buttery; Chardonnay-like.

Flavors: Yeasty, pineapple, pears; subtle *sur lie* character, toasty, buttery, vinous.

Balance/Finish: Complex, slight oak complement, harsh, coarse, lengthy,


CHAPPELLET
1988
Napa Valley
Chenin Blanc
"Dry"
PRODUCED AND BOTTLED BY CHAPPELLET VINEYARD PRITCHARD HILL ST HELENA CA. U.S.A. B W 4537
ALC 13.3% BY VOL
CONTAINS SULFITES




PINE RIDGE
1989
Napa Valley
CHENIN BLANC
Yountville Cuvée
PRODUCED AND BOTTLED BY PINE RIDGE WINERY
NAPA, CALIFORNIA • BW 5012 • ALCOHOL 10.0% BY VOLUME

Kiona
1988
ESTATE BOTTLED
Yakima Valley
CHENIN BLANC
PRODUCED AND BOTTLED BY KIONA VINEYARDS WINERY
WEST RICHLAND, WASHINGTON, USA BW 75 ALCOHOL 12.0% BY VOLUME

slightly tart; slightly spritzy. Good food wine.

1988 Kiona Vineyards & Winery, 2% R.S.

Color/Aroma: Light yellow. Melony, peaches, vegetal, green peas, alfalfa, mushrooms.

Flavors: Lemony, green apple, complex, slightly soapy, alfalfa, grassy.

Balance/Finish: Medium rich; good complexity; mouthfilling; slightly coarse; high-alcohol impression; unusual style.

1989 Chateau Ste. Michelle, 1.44% R.S.

Color/Aroma: Pale yellow. Citrus, melon, spicy, honey, delicate tropical fruit.

Flavors: Lemony, delicate spice, pear, pineapple, apricot.

Balance/Finish: Good sugar/acid balance; short to medium finish; slight spritz; good aperitif wine.

1989 Grand Cru Vineyards, 0.86% R.S.

Color/Aroma: Light straw. Peaches, herbal, alfalfa, banana ester, apple sauce, peach, nectarine, pear, floral, spicy, plum, fresh-cut grass, celery.

Flavors: Green tea, licorice, pears, melons, canned peaches, citrus, tangerine, nectarine, apples, spice.

Balance/Finish: Tartness offers mouth freshness; assertively varietal; sugar well-balanced to acidity.

1989 Dry Creek Vineyard, 0.70% R.S.

Color/Aroma: Pale straw. Toasty, smokey, yeasty, pineapple, apple, orange peel, honeysuckle.

Flavors: Citrus, apples, some green bean, ripe figs, fleshy.

Balance/Finish: Good intensity; good balance with clean finish; slightly herbaceous style; big and mouthfilling; coarse, some phenols.

1989 Hacienda Wine Cellars, 0.73% R.S.

Color/Aroma: Light yellow. Melony, apple, pineapple, dry fig, intensely varietal, pear, cinnamon, flora, roses, baking spice.

Flavors: Rich, lemony, apricots; intensely fruity; melons, pears.

Balance/Finish: Tart apple finish; delicate, young style best for current drinking; palate-cleansing; crisp and clean; well-balanced.

1989 Pine Ridge Winery,
Yountville Cuvee, 1.4% R.S.

Color/Aroma; Very pale, almost green. Sweet fig, pears, melons, tropical punch, cream soda, varietally concentrated.

Flavors: Melons, lemony, sweet apple, canned peaches, cream soda, pears, honey.

Balance/Finish: Focused and stylish; crisp, lively and fresh; pleasing, aperitif-style.

1989 Monterey Vineyard, 1.7% R.S.

Color/Aroma: Light yellow. Tart apple, cinnamon, green bean, smokey, dried grass, eggplant, honeysuckle, spice, leafy, lemon oil, pine forest.

Flavors: Pineapple, ripe pear, grassy, slight licorice, spicy, floral.

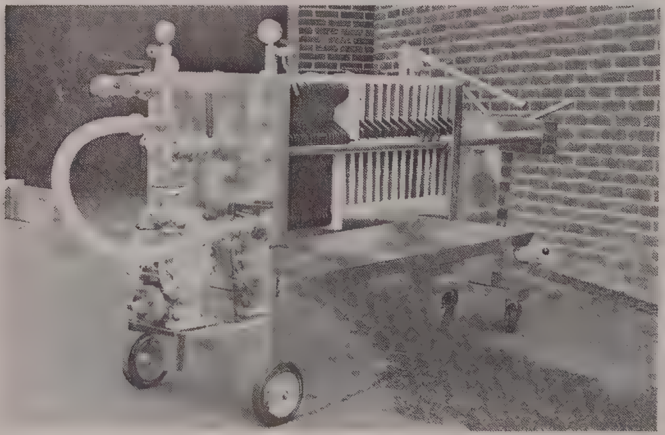
Balance/Finish: Chardonnay-like; lengthy with full fruit in finish; very viscous; velvety; coarse.

1989 Sutter Home Winery, 4.0% R.S.

Color/Aroma: Pale yellow. Figs, hay, intense honey, spice, lemony, pineapple, pear.

Flavors: Sweet, floral, rosewater, glycerin, pears, figs, concentrated, apple sauce, cotton candy; spicy-like Gewürztraminer.

Balance/Finish: Sugary aftertaste; too soft; lacks punch in finish; sweet; lacks crispness. ■



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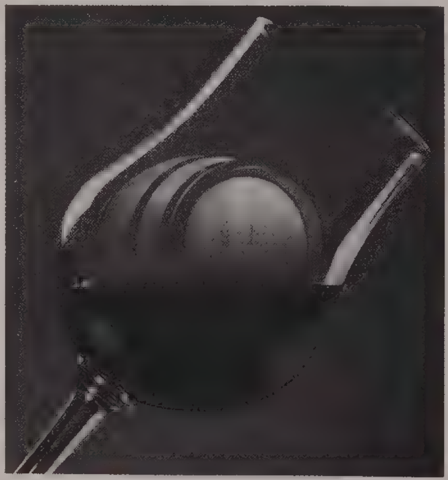

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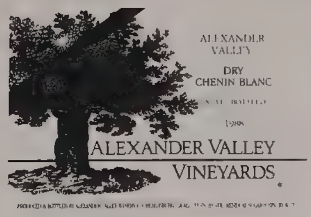
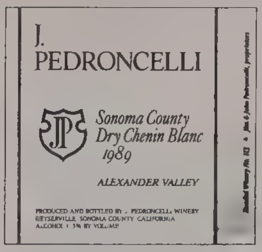
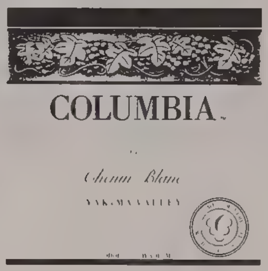
CHENIN BLANC




J. PEDRONCELLI
Sonoma County Dry Chenin Blanc 1989
ALEXANDER VALLEY
PRODUCED AND BOTTLED BY J. PEDRONCELLI WINERY GEYSERVILLE, SONOMA COUNTY, CALIFORNIA

Ste. CHAPELLE
1 9 8 9
Soft Chenin Blanc
WASHINGTON
Residual sugar 7.0% by weight
PRODUCED AND BOTTLED BY STE. CHAPELLE, INC. CALDWELL, IDAHO



Stronger sales than you might imagine

By Millie Howie

More than 100 wineries in 18 states make and sell Chenin Blanc. Only a handful do any promotion of this varietal. Many wineries don't need to promote their Chenin Blanc, because the small quantity produced is quickly purchased by the already-converted. But others are still feeling their way, both in wine style and in the marketplace.

The largest producer of Chenin Blanc in the U.S. is Sutter Home Winery, St. Helena, CA, with 1989 sales of 74,000 cases, an increase of 40% over 1988 sales. According to an August, 1990 Inforscan survey reported by Information Resources, Inc. of national sales tracking, Sutter Home Chenin Blanc was #1 in each of 20 major metropolitan markets. It rated #2 in Los Angeles, CA; #5 in San Francisco, CA; and #8 in Seattle, WA.

"Sutter Home Chenin Blanc is sweet," comments Stan Hock, Sutter Home Director of Public Relations, "but even with 4.0% residual sugar, it's not cloying. It has good acid and lots of fresh, fruity flavor. With only 9.4% alcohol, the Chenin Blanc is designed to be an easy drinking aperitif wine, and it does well on its own.

"Because Sutter Home has built its own niche and virtually sells itself, there is no Chenin Blanc promotion. I think what's happened, is that there is such a franchise in the brand, we can add wines to our line and consumers are confident of getting a good wine at a good price."

For other wineries, even with limited production, a little push makes a big difference. "We've tried to determine where to position Chenin Blanc," says Crawford Cooley, President of Hacienda Winery in California's Sonoma Valley. "We do not suggest it is a 'poor-man's Chardonnay', but an 'everyman's' Chenin Blanc, showing the best example of what this grape has to offer. Our aim is to appeal to the consumer's sense of a quality wine."

To get the idea across, Hacienda decided to inject a little humor and a small budget into an advertising campaign, based on the imaginative theme, 'No More Blah Chardonnay'. They prepared the 'aggressive advertising' as described by Cooley, for the Wine Spectator.

The ad artwork was simple, with the headline in bold, block letters, and body copy emphasizing that Hacienda Dry Chenin Blanc is a good wine at a good price.

"We produced tee-shirts and cocktail napkins," Cooley continues, "using the universal symbol for 'NO' (a red circle with a slash) through the words 'Blah Chardonnay', while we made a strong sales effort to establish Chenin in wine-by-the-glass programs.

"We played on the humor, and a lot of restaurants and bars picked up on it and had fun with it. The program attracted a lot of attention from our distributors throughout the U.S. who liked it and thought it was strong support for them.

"It's time for a wine like this. People have tried White Zin, and found it generally pleasing, but it has never settled on a style, so there is disillusionment and disenchantment with much of the White Zin in the marketplace. A lot of the same appeal that first attracted wine drinkers to White Zin is also part of the enjoyment of Chenin Blanc — slight residual sugar and a high fruit level.

NO MORE BLAH CHARDONNAY

Hey, look,
we love a good Chardonnay.
We make an excellent one ourselves
(Wine Spectator selection: 92 rating).
And that's how we know it's
next to impossible to make a *quality*
Chardonnay for $6 or $7.

It just comes out blah.

However, for about the same price,
you can enjoy the finest Dry Chenin Blanc
available. Hacienda. Crisp. Complex.
Elegant. And winner of several
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It's the refreshing alternative to
blah Chardonnay.

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MARKETING

"I have noticed that several wine writers, who formerly dumped on Chenin Blanc, are now saying it is a wine to be considered. Our Chenin Blanc is made in the Vouvray style, and priced in line with low-end Chardonnays. I do believe we've attracted a group of new wine drinkers who are moving up the spectrum."

'Soft' wines are not hard to sell

Hacienda's Dry Chenin Blanc has 0.75% r.s., which makes it considerably less sweet than many, such as the two produced by Ste. Chapelle Winery in Idaho. One Ste. Chappelle Chenin is designated 'soft' with 7.0% r.s. and 9.0.% alcohol. The other, their 'regular', has 2.8% r.s., but, says Jack Cortabitarte, president of Chapelle USA, the winery's marketing representative, "The wines of the northwest have such good, high acid, that it balances out the sugar."

Until Ste. Chapelle's vines came into production in 1990, all the grapes for it's Chenin Blancs came from Washington State.

Sales in 1990 were about 3,000 cases of regular Chenin Blanc and 2,800 cases of the soft. Kathy Mertz, Ste. Chapelle General Manager, reports the soft style sells very well in Idaho, where a substantial audience for the sweeter wine buys most of the current vintage.

In California, Geyser Peak Winery in Geyserville, is changing the style of their Chenin Blanc from 12.0% alcohol and 1.5% r.s. to a soft style as an addition to its expanding line of 'soft' wines. "Both our soft Johannisberg Riesling and soft Gewürztraminer have about 9.5% alcohol and 2% r.s., and were immediately accepted," says Public Relations Director Ann Rizzo. "This wine style has become very popular as consumers frequently request fresh, flavorful, slightly sweet, low alcohol wines. We will release the 1990 Chenin Blanc in this 'soft' style in March of 1991."

Also soft, though substantially sweeter than the Geyser Peak Chenin, is the bottling of Columbia Winery, Woodinville, WA. Like its Idaho neighbor, Columbia's 4,500 cases of Chenin Blanc are a quick sell-out in its home state.

"Every year we ask ourselves: are we going to continue production of this varietal?" remarks Columbia Sales Director Greg Herman. "The answer, so far, has been yes. It's a charming wine, with enough acidity to balance the rich fruitiness. We sell every bottle, and there is a broad, loyal audience out there — not specifically for Chenin Blanc, but for our three off-dry wines: Johannisberg Riesling, Gewürztraminer, and Chenin.

"The residual sugar level of the Chenin is about 2% to 2.5% and the alcohol is about 10.5%. We promote the three wines together, and they are in the same price bracket, around $4.50/750mL. At that price point, they sell.

"For the past five years, we have conducted training programs for the trade, and we always point out how natural and interesting Chenin Blanc is with a wide range of foods. We bring wholesalers and retailers to the winery and show them how the wines are made, and conduct comparative tastings. Maybe that helps account for the continuing sell-out of the wine."

For Alexander Valley Vineyards in Healdsburg, CA, Dry Chenin Blanc, at just over 0.5% r.s., is the 'in-between wine', filling consumer demand between Johannisberg Riesling and Chardonnay. When Marketing Director Katie Wetzel Murphy is on selling trips, she knows if she can get a reluctant retailer to taste the Chenin, she'll have a sale.

Julie Pedroncelli of Pedroncelli Winery, Geyserville, CA, agrees that tasting is the key. "We discontinued Gewürztraminer, and there are those who miss it. So, I say, 'If you liked the Gewürz, try this.' It's surprising how that taste will convince them that Chenin Blanc is a wine to be considered.

"We do work with some promotional materials including shelf talkers, casecards, and reprints of any favorable press notices. It helps, too, that the 1989 Dry Chenin Blanc won a gold medal at the San Francisco Fair. Medals still make an impression, and once you catch the buyers' attention, you're halfway there."

"The average American consumer is looking for an easy-drinking wine that goes well with many kinds of food," states Eric Laumann, winemaker at Hacienda Winery.

"It's a really good wine for export — well liked in Canada, Switzerland, and West Germany," says Cooley. "In 1989, 20% of the Hacienda Chenin Blanc was exported.

"This year we're going to hold tight on the quantity to see where sales are going. Because Chenin Blanc should be consumed when it is young, it's to our advantage to sell in quantities that move off the shelf quickly." ■

CHENIN BLANC

Food & wine harmonies

By Eleanor & Ray Heald

PWV's varietal review of Chenin Blanc included eleven wines with residual sugars ranging from a barely perceptible 0.15% to a sweet wine with 4.0% r.s.

The food compatibility of these wines was assessed by Jimmy Schmidt, chef-proprietor of the Rattlesnake Club in Detroit, MI, and the restaurant's wine director, Madeline Triffon.

After tasting the wines at one sitting, Schmidt and Triffon separated the Chenin Blancs into groups:

Group 1 — Dry: 1989 Callaway Vineyard & Winery; 1989 Dry Creek Vineyard; 1989 Girard Winery; 1989 Grand Cru Vineyards; 1989 Hacienda Wine Cellars.

Group II — Sweet-edged: 1989 Chateau Ste. Michelle; 1989 Monterey Vineyard; 1989 Pine Ridge Winery; 1989 Sutter Home Winery.

Group III — Atypical (not displaying varietal characteristics): 1988 Chappellet Winery.

Group IV — Mildly corky: 1988 Kiona Vineyards & Winery.

To provide a frame of reference, Schmidt and Triffon added two wines from the Rattlesnake Club's wine list: the 1988 Chapin-Landais Vouvray in Group I and the 1988 Simi Winery Chenin Blanc in Group II.

"We opened the Vouvray to observe any major structural differences between French and American Chenins," Triffon states. "This Vouvray displayed very strong varietal character, particularly in the aroma."

"The Simi 1988 Chenin Blanc is a honeyed, plush execution of the sweet-edged style," Schmidt maintains. "It is more concentrated and bottle-evolved than the 1989 Pine Ridge."

Food and wine harmonies

Within Groups I and II, the 1989 Hacienda and the 1989 Pine Ridge were assessed as wines typifying the best examples of winemaking in their respective styles. "In my opinion, these are benchmark American Chenins," says Triffon. "Their true-to-type varietal style, quality palate fruit levels, and resultant charm make them easier to match with food.

"The intensity of Chenin Blanc and perception of actual or illusory sweetness are similar to that of German Rieslings. But the aromatics are not similar. However, because the acidity is not as pronounced and the alcohol is usually higher in American Chenins, they are not as easily useful in pairing with food.

"With the Chappellet, it seemed that the winemaker's intent was to treat it as a non-aromatic variety, *i.e.* Chardonnay. The result came across somewhat hard and lacking charm. However, in hindsight, I believe that the difficulty with both the Chappellet and Kiona bottlings is age. My experience has shown me that most American Chenin Blancs drink best in the first year after harvest. The Simi bottling is an exception to my rule of thumb."

Schmidt maintains that the American Chenin Blancs, even the driest examples, were generally round, and mild in varietal character and acidity. "They were not as varietally defined as the Vouvray," he says. "The impression was what I call a watercolor structure, not angular and defined, but gentle, easy, and straightforward."

In the sweet-edged group, both the Monterey Vineyard and Sutter Home wines were assessed as too top-heavy in sweetness and deficient in acidity to be considered good matches for food. "Neither was flawed," Triffon adds. "If served well-chilled, they both make pleasurable quaffing wine and will please the segment of the market requesting this style."

On the dry side

To accompany wines in Group I, Schmidt prepared a gravalax with cucumber salad. The gravalax was cured with sugar and salt and not smoked. The cucumber salad resembled a coarse salsa flavored with dill, red peppers, sherry, sherry vinegar, and olive oil.

"For smoked salmon, a wine of higher

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acidity than Chenin Blanc is needed," Schmidt affirms. "Because the aftertaste of gravalax is not as strong or lingering as with smoked salmon, the drier Chenins work well. Otherwise, more acidity and purity of fruit would be needed.

"Fresh dill works exceptionally well with dry-style Chenin Blanc. The salad provides a fresh, zingy bridge between food and wine.

"An equally good selection would be a lightly smoked lake trout."

Citrus sauces with mild fish

The sweeter-edged Chenin Blancs did not come across as sweet on the palate with the following pairings.

Schmidt grilled halibut with pink grapefruit and rosemary because the high-toned acidity in the sauce turned down the sweetness perception in the wine. "Halibut is a neutral fish," Schmidt says. "Grapefruit marries with citrus in wine and provides a pleasant see-saw effect."

The sauce consisted of pink grapefruit, fish fumet acid reduction, butter, and grapefruit zest.

Schmidt showed that grilled tuna with passion fruit and cream worked well with wines in both groups I and II. "I'm pleased with the match, but I think the drier Chenins function better against the fattiness of tuna," he stresses. In this preparation, the texture of the sauce is more viscous than the previous grapefruit presentation, though the fruit acid is as pungent."

The sauce was prepared from a reduction of fish fumet, champagne, citrus juices (orange, lime, and lemon), cream, and sweetened passion fruit puree.

Salty cheeses

The higher acidity level and concentrated flavors of the French Vouvray worked well with a strong, salty Romano cheese. A milder Parmesan fared well also.

But the American Chenins, even the Hacienda and Pine Ridge, were overpowered by the Romano. However, a veal chop sauteed with pan juices and topped with a light grating of Romano cheese added a perfect complementary flavor.

The American Chenin Blancs were acceptable with Parmesan, but the marriage was unexciting. For a cheese course harmony, Provolone, a mild, medium-hard cheese worked better with the American Chenin Blancs.

Conclusions

Both dry and sweeter styles of Chenin Blanc work admirably as quaffing wines with cold, simple buffet luncheon or picnic food such as shellfish, salads, grilled fish, or poultry. But lack of aggressive fruit and acidity in American Chenin Blancs make pairing with complex dishes, sauces, or food (*i.e.*, foie gras) problematic.

The solution is citrus-based sauces that supplement acidity and fruit. The idea is to make the wine taste better served with food than it does by itself.

In general, specific herbs (dill, chives, spearmint, lemongrass, and lemon basil) help to accomplish this. Sweet and flowery herbs (tarragon and green basil) should be avoided, with the exception of cumin (a sweet-edged herb). Schmidt's fried oysters with cumin dressing was complementary to the wine.

The wines did not work as a cooling agent for hot spice; the wines' fruit flavors flattened out and the heat remained. ■

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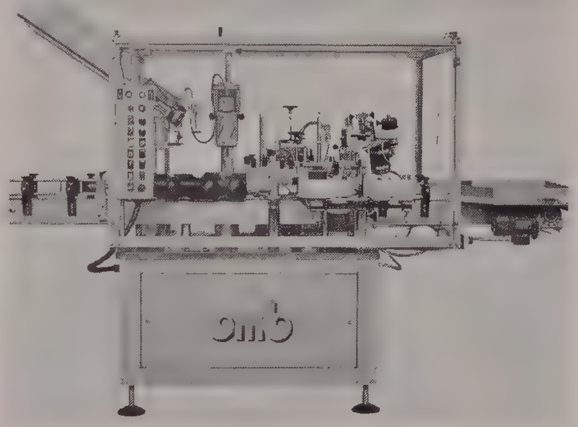

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Automated wine chemistry

To help wineries meet the challenge of monitoring cellared wine, ETS Laboratories in St. Helena, CA, is now offering a precise, cost-efficient, and rapid monitoring program, using micro-continuous flow analysis (MCFA).

The challenge

With the expanding selection and rising prices of fine wines, critics and consumers are becoming more sensitive to technical defects and are less willing to overlook them in wine evaluation and purchase. Wine critics, in an effort to eliminate inferior wines, are quick to seize upon minor flaws such as a slightly volatile or oxidized character.

Slight technical defects in the backbone of an otherwise outstanding wine are no longer tolerated, and ever increasing technical integrity must accompany the art of winemaking. However, due to the pressures of time and budget, technical monitoring of a winery's most valuable asset, cellared wine, is often less than thorough.

Today, the financial risk of slight defects or spoilage in wines is too great to rely on organoleptic evaluation or occasional random sampling for analysis to pinpoint low SO_2 levels, microbial spoilage, or developing volatile acidity (VA) problems. Limitations of manual analysis dictate random composite sampling methods that are ineffective in maintaining the optimum SO_2 levels necessary to combat oxidation and the growth of spoilage organisms.

Sensory analysis is unreliable. For example, most people cannot detect levels of volatile acidity (acetic acid) below the legal limits, and many acescent wines are high in ethyl acetate rather than acetic acid.

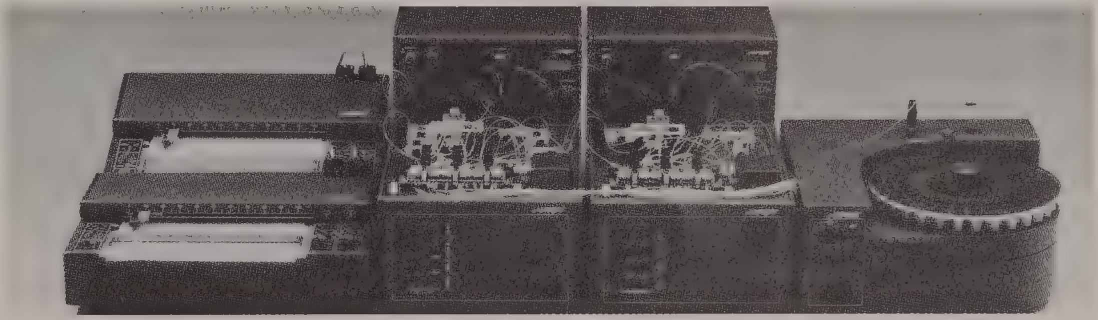
Historically, winemakers, have monitored a wine's health by measuring SO_2, VA, and pH levels. The manual analytical methods used to determine these key indicators are imprecise, time-consuming, labor-intensive, and expensive.

Winery laboratory monitoring programs have been prone to other problems such as inconsistency due to personnel turnover, poor reagent preparation, and poor equipment maintenance. In addition, many winery in-house laboratories lack formal programs of quality control.

The system

A cost-efficient, precise, and rapid system to monitor wines during production and storage is essential to meet these analytical challenges. After two years of development, ETS Laboratories has implemented the first MCFA system for the American wine industry.

The resulting analytical protocol is rapid, precise, and has very good correlation with manual analytical methods. This new system has the potential to simplify rather than complicate a winemaker's job by providing a valuable tool for maintenance and protection of premium table wine quality.



Micro-continuous flow analysis equipment.

The MCFA system tracks pH, VA, free SO_2, total SO_2, and total titratable acidity of musts and wines. The system monitors each parameter, with high precision never before available, to help a winemaker detect the earliest stages of deterioration or spoilage. Thus, winemakers often can be alerted of potential irreversible oxidation or bacterial spoilage in time to prevent the loss of expensive wine and cooperage.

The precision of the MCFA program permits SO_2, VA, and pH levels to be followed acurately. Such trend monitoring is impossible with manual methods, due to their inherent imprecision.

Wine monitoring can be costly in terms of supervision time required of professional staff whose time can be better spent on winemaking than on routine wet chemistry. The MCFA program eliminates the need for traditional, tedious in-house analyses, and enables the winemaker and technical staff to concentrate on the more demanding tasks associated with creation of fine wines.

The speed and precision of MCFA provides inexpensive, reliable, and convenient cellar monitoring for wineries of any size. These advantages apply not only to inventory monitoring, but to all routine analyses available on the MCFA program.

For a small winery with limited technical staff, an inventory sampling program utilizing MCFA will allow continuous testing of wines in bulk storage without requiring a full-time technician or committing the winemaker or cellarmaster to hours in the laboratory.

A medium-sized winery with a laboratory equipped for routine wine analysis will save laboratory time and costs, especially in large volume cellar trend monitoring.

The large winery will obtain faster results, real savings in reduced laboratory staff and supplies, and increased confidence in the reliability of results.

MCFA has its roots in the more primitive, traditional macro-scale, air segmented, continuous flow analysis (CFA) systems such as the Technicon AAII (Technicon Instruments Corp., Tarryton, NY). Such CFA systems have been accepted for automated analysis of wine in Europe for more than 20 years. Both private and governmental laboratories throughout Europe utilize CFA for the determination of up to eight wine components simultaneously.

MCFA techniques are largely the result of evolutionary changes in traditional CFA equipment. One change is a reduction in the internal dimensions of flow paths from 2.4 mm ID to 1 mm ID so that lower reagent flow rates and smaller sample volumes can be utilized.

Other changes are: an increase in gas segmentation rate, electronic timing of the segmentation gas, and the use of advanced detectors that eliminate the need to either remove the air segmentation bubble or 'de-bubble' the segmented analytical stream prior to sample detection.

These are important when reagent costs, waste disposal, and limited sample volumes are significant concerns.

Several existing CFA chemistries were considered by ETS for adaptation to the MCFA technology. Initial evaluation revealed that none of the existing flow chemistries offered the precision, accuracy, reliability, or correlation with reference methodologies necessary to meet the stringent standards of ETS Laboratories.

In addition, the existing CFA chemistry reagents contained highly concentrated mercury and other toxic compounds. Serious laboratory health hazards and issues associated with disposal precluded consideration of these European CFA chemistries. Extensive research was conducted to develop alternative methods that significantly improved precision, accuracy, correlation, and sample capacity.

Following development of the MCFA methodologies, comprehensive studies were undertaken to examine correlation of the newly developed methods with AOAC and other reference methods. Results of these studies are being submitted for publication in the *Journal of the American Society of Enology & Viticulture.*

MCFA is a system whereby small sample volumes are drawn from an autosampler and carried, in parallel, through either colorimetric or enzymatic reactions. The MCFA system developed by ETS represents an investment of more than $250,000 and requires a specially trained chemist. Exact details of the analytical procedures are proprietary but, in principal, the chemistries are as follows:

Total acidity — Dialysis of sample in a buffered stream against buffered colored reagent with subsequent colorimetric measurement.

Volatile acidity — On-line distillation followed by colorimetric determination.

Free SO_2— Sample acidification followed by gas dialysis and colorimetric reaction.

Total SO_2— Sample acidification followed by heat hydrolysis, gas dialysis, and colorimetric determination.

pH — Micro-flow cell electrode determination against four-point curve.

Turnaround and cost

The normal turnaround time for MCFA analysis is one working day. Wine samples received at ETS by 10am will be reported not later than the morning of the next working day. More urgent requests can often be accommodated. Once the analysis is completed, analytical data is reported to the client by facsimile, when available.

ETS is also completing development of a computer network system that will allow samples to be identified with bar codes and results sent via modem or computer mailbox system directly to clients. The computer network system will also allow customization of MCFA data presentation for volume users, saving valuable staff time.

The cost of the five-component MCFA panel can be as low as $10 per sample for a client whose volume significantly increases utilization of the system. This fee is only a small fraction of the cost any winery would incur by doing the same analysis in-house.

From a winemaking standpoint, MCFA offers many more valid choices for monitoring wines. Winemakers can now reasonably examine a total cellar sampling on a monthly or quarterly basis.

MCFA technology allows meaningful monitoring of ageing inventories for the first time. No longer will time or cost dictate sampling techniques that are inaccurate or inadequate, such as choosing storage vessels to be sampled based on easy access, or truly meaningless 'composite' sampling of random barrels.

Winemakers and winery owners can achieve a much greater assurance that their investment in the production of fine wines will not fall victim to preventable maladies during the ageing process. Sampling protocols can be developed individually with each winery utilizing the MCFA system to ensure minimum cost and meaningful tracking of inventory without disruption of normal winery operations.

The MCFA program at ETS Laboratories ensures accuracy and precision through an extensive quality assurance program. This program includes replicate standards and computer-generated statistical analysis of each day's analytical results. Winery clients are invited to submit control samples along with cellar samples for analysis. ■

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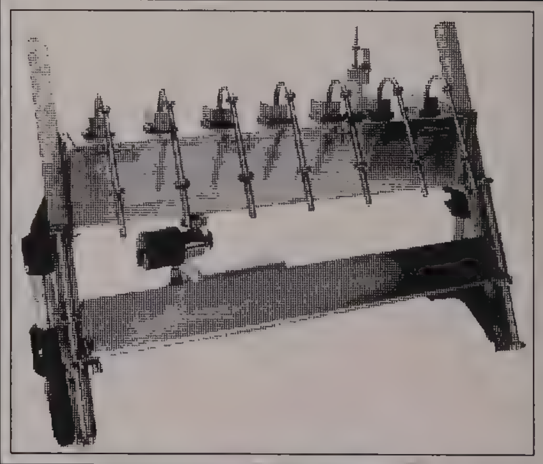

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Pesticide residue monitoring

Pesticide production and use throughout the world has increased steadily over the past 50 years. An estimated 2.7 billion pounds were used in 1988 in the U.S. alone. Meanwhile, public concern over the widespread use of pesticides has exploded, ignoring the pivotal importance of pesticides for agriculture. Without these agrochemicals, a major portion of the world's food supply would be at risk and many nations would face serious problems of hunger and malnutrition.

A 1989 speech to the U.S. Congress by Dr. Sushma Palmer (Director of the National Academy of Sciences' Food and Nutrition Board) suggested that ingestion of small amounts of pesticides and other dietary chemicals has no adverse effect in humans.

Elimination of certain fungicides could actually raise cancer risks by promoting the growth of natural and extremely potent fungal carcinogens. Plants contain natural toxins that serve as a defense against pests. Often, these are more potent than man-made chemicals and occur in larger quantities.

The value of pesticides, to society in general and to grape and wine production in particular, cannot be denied. Nonetheless, public pressure to ban or curtail pesticide use grows steadily. Initiatives such as the California proposition 128, 'Big Green', have sought immediate elimination of certain pesticides in wide use within the grape and wine industries.

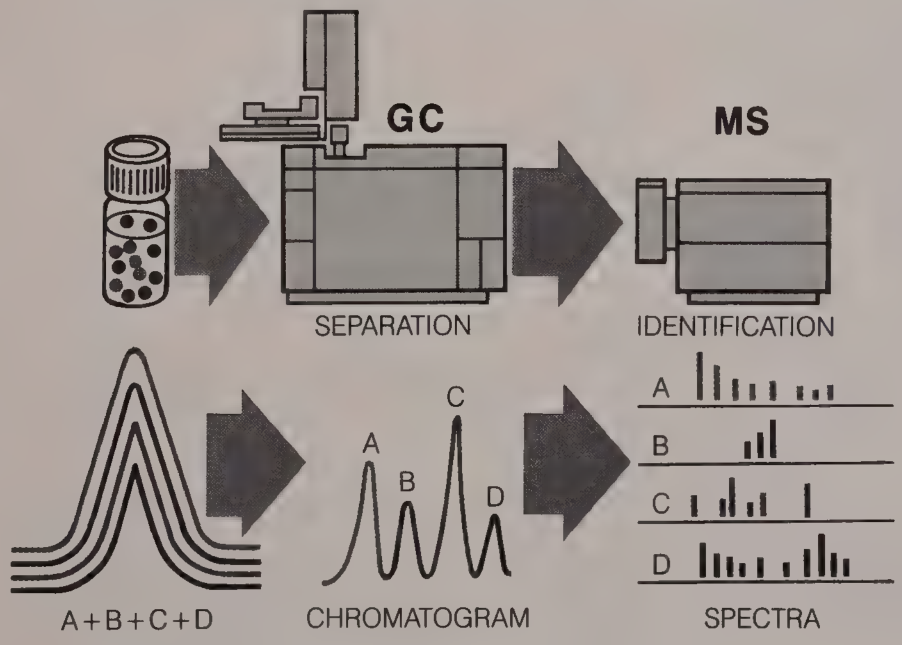
Many wineries are under increasing pressure from the marketplace to document that their products contain no pesticide residues. The legal departments of some wineries insist that, from a liability standpoint, documentary evidence must be maintained regarding the pesticide status of their products.

Until recently, obtaining such documentary evidence has been prohibitively expensive and time-consuming. Few laboratories have developed the specialized techniques required for pesticide residue analysis in wine.

The complex wine matrix, the large number of target pesticide compounds, and the required low detection limits have made it difficult and costly for wineries to implement effective pesticide residue monitoring programs.

For several years, ETS Laboratories, St. Helena, CA, has performed specific pesticide residue analysis in wine and juice samples using a variety of gas chromatography with mass spectrometry (GC/MS) methodologies. GC/MS is commonly used by competent environmental and agricultural laboratories to validate positive findings from less specific pesticide methodologies.

GC/MS provides positive identification of pesticide residue.



In 1990, in response to the wine industry's needs, ETS began an extensive research project to develop a multi-residue pesticide procedure that included optimized extraction, clean-up, and analytical protocols specifically tailored for the wine matrix. GC/MS is now being used by ETS to detect, identify, confirm, and quantify residues in every sample. The procedure is the result of a joint developmental effort by ETS and Hewlett Packard Analytical Instruments.

An important aspect of this method development was to identify those pesticides used on wine grapes in the U.S., and to validate an analytical protocol specifically for those compounds in the wine matrix. Growers and viticulture experts submitted lists of compounds used on wine grapes throughout the U.S.

Extensive research was also conducted regarding compounds detected on grapes and in wine by the Food & Drug Administration. Lists of pesticide compounds of concern to the Canadian and Japanese governments were also obtained.

The resultant combined list of pesticides includes organochlorine, organophosphorus, organonitrogen, and carbamate compounds, plus others which fall out of these categories and have, consequently, traditionally required specialized custom analysis.

This GC/MS method detects and positively identifies almost all of these compounds. ETS has developed or adapted and validated additional specific analyses for the few pesticide compounds that are not amenable to any gas chromatographic method because of their structure.

Multi-residue method background

Multi-residue analytical methods for pesticides generally require a technique to: extract, clean up, and separate the residues from co-extracted matrix compounds; measure the residues and confirm their identity. These multi-residue methods must provide reliable identification and quantitation of a large number of compounds at very low concentrations.

The most commonly applied measurement techniques in multi-residue analysis are gas chromatography (GC) with selective electron-capture (ECD) and/or nitrogen-phosphorus (NPD) detectors. These techniques allow detection of residues at low concentrations with some degree of selectivity.

Reliability of multi-residue GC analyses without GC/MS can be enhanced by several different approaches. The most commonly used is effluent splitting to two selective detectors. Each peak is characterized by its retention time and its response factors in the different detectors. Confirmation is accomplished by applying the same technique to a second gas chromatographic column with a different order of separation.

Other methods to identify suspected pesticide residues utilize a combination of effluent splitting and data processing against a database of calibrated compound retention times. To obtain absolute confidence in residue identifications, subsequent analysis by GC/MS is required.

GC/MS detection

The mass spectrometer portion of GC/MS is the most specific detector available in multi-residue analysis.

This specificity is based upon the fact that molecules bombarded with electrons of particular energy under vacuum conditions fragment following strict rules. The resulting fragmentation pattern reflects the individual molecular structure in a mass spectrum which is often considered as a 'fingerprint' of the substance. These mass spectra show such specific characteristics that it is possible to positively identify tens of thousands of compounds with absolute confidence.

It is of great importance that these mass spectra depend not on the instrument used, but on the ionization conditions applied. Ionization conditions can be easily reproduced. Therefore, it is possible to compile mass spectra, recorded from many sources, in database libraries. Unknown compounds can be identified by comparing their spectra with well-established library spectra.

As a result of this methods development and the pesticide use research mentioned above in this report, a list of targeted compounds has been compiled and validated in the wine matrix. Besides these targeted compounds, over 300 other pesticide compounds are detectable and identifiable using this method of GC/MS.

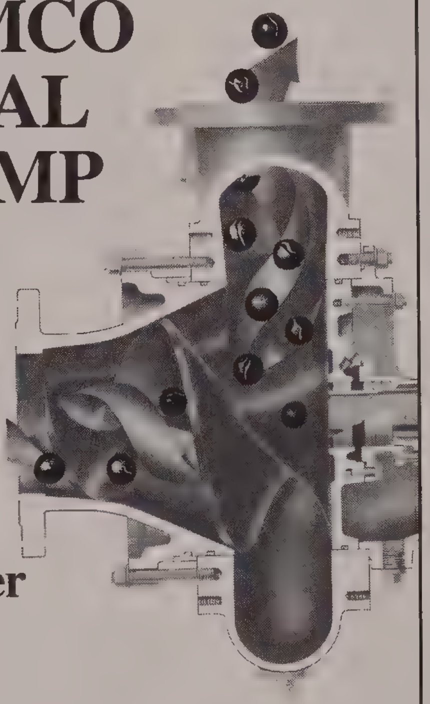
The analytical methodology developed by ETS includes multiple extractions, which are then concentrated, cleaned up, and submitted to capillary column GC/MS analysis. This methodology has been fully validated in comparison with, and provides results equal or superior to, the FDA 'Luke' procedure. A comprehensive quality assurance protocol is in place to assure continued optimal performance of the analysis.

Future trends

Justified or not, public concern over pesticide residues is not likely to diminish of its own accord. Government regulations regarding pesticide residues will certainly continue to become more strict and will be rigorously enforced.

Wineries increasingly will be called upon, either in the marketplace or by domestic and foreign governments to document the absence of pesticide residues in their products. Progressive wineries will continue to implement ongoing pesticide residue monitoring programs in efforts to secure market position and forestall regulatory difficulties at home or abroad.

As a result of these trends, high confidence and practical multi-residue methods, such as the GC/MS protocol described, will assume growing importance to the wine industry. ■



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WATER: Issue of the 90's

By Julie Morrison

(Reprinted and edited from "Foghorn", Carneros Quality Alliance, Summer 1990)

"Water is the most emotional and critical issue in the Carneros," says Mike Walsh, who manages 1,000 acres of Carneros vineyard owned by Beaulieu Vineyards, Clos Pegase Winery, Cuvaison Winery, Saintsbury Winery, and Silverado Winery.

"It's finally emerging as a primary resource that you either have or don't have," says Lee Hudson, owner of the 93-acre Hudson Vineyards in the Carneros.

A recent surge in vineyard development in Carneros coincides with a fourth consecutive drought year, creating demands on a water supply already stretched thin.

Natural lack of water

Lack of water due to low rainfall, salt water intrusion, and poor soil permeability has historically proven to be a restricting factor in both agricultural and residential development in the Carneros.

Carneros has the lowest rainfall with an average 20 inches/year, compared to 30 inches in mid-Napa Valley or Sonoma County. In 1990, Carneros received approximately 13 inches.

Moisture-laden breezes blowing off the San Pablo Bay to the south first encounter land in the Carneros, but it is not until the marine air hits the slopes of Mt. St. Helena 20 miles to the north (an annual average rainfall of 60 inches) that the moisture is released.

The proximity of San Pablo Bay, which virtually laps the southern boundary of the region, poses a constant threat of salt water intrusion into the groundwater, according to Teresa Bulman, physical geographer at UC Davis.

Moisture retention of soil

The dense clay soils in Carneros tend to retain what little water there is, and it is more difficult for water to percolate through upper soil layers to the water table below.

Unlike viticultural areas in which irrigation is unnecessary due to high rainfall and deep alluvial soils that encourage vines to develop deep root systems, Carneros soils are extremely shallow — generally three feet deep — severely restricting the development of the vine's root system. Growers compensate by applying short, frequent irrigations throughout the growing season.

Learning to adapt

Opinions vary widely as to how much water a vine needs to survive in the Carneros. Some growers do not apply any water to mature vines, while most apply between 25 and 125 gal/vine during the growing season. Growers in California's Central Valley — where the soils are sandy and temperatures extreme — may apply 400 to 1,000 gal/vine/year.

To meet water needs, Carneros growers resort to drilling wells, building reservoirs, seeking water rights from streams and creeks, and installing drip irrigation systems.

The most inexpensive method of procuring large amounts of water — assuming there is water to be had on a property — is to drill a well. A good well in the Carneros fulfills a grower's water needs as measured in gals/minute and imparts no excess boron or salinity, which can be toxic to grapevines.

Many small growers get by with 25 to 50 gal/minute wells or no well at all, while larger growers need a well producing upwards of 200 gals/min.

"If you have 20 acres of vineyard," explains Zach Berkowitz, vice president of vineyard operations at Domaine Chandon, "you will be able to irrigate from a well with 25 gals/minute. If you have 500 acres, 25 gals/minute is a drop in the bucket."

Within the Carneros, there is wide variance in water availability. Historically, the Sonoma side has been considered a better water source than the Napa side, presumably due to a strata of Sonoma volcanic soil that collects water.

Sangiacomo Vineyards, for example, consists of 1,000 Sonoma/Carneros acres and 12 wells, ranging from 150 to 450 feet in depth, that yield 200 to 450 gals/minute. Gloria Ferrer has a 300-ft well providing 300 gals/minute. Walter Schug, who is preparing to build a winery and plant a vineyard adjacent to Gloria Ferrer, recently drilled a well with an output of 200 gals/minute at 400 ft.

A series of new wells drilled on the Napa side (240 gals/minute at 600-ft for Domaine Carneros and 250 gals/minute at 800-ft for Robert Mondavi Winery) challenge the assumption that water is more abundant in Sonoma.

Once a well is installed, water may be pumped as needed, either into the drip irrigation system, a holding tank, or a reservoir.

While a well can be drilled for approximately $10,000, the cost of building a 50-acre foot reservoir — large enough to irrigate 150 to 200 acres — can run as high as $100,000, plus lost income resulting from the removal of grapevines.

In addition to storing well water, reservoirs collect water that drains directly from a watershed or is pumped from streams and creeks. The mixing of water from different sources works to the advantage of growers such as Domaine Carneros, which dilute well-water containing low levels of salt.

Although obtaining a permit to drill a well is a routine task, procuring surface water rights is no small endeavor. A permit must be granted by the California Water Resources Control Board prior to drawing any water from streams or creeks traversing land parcels.

In simple terms, an extremely complex web of overlapping water rights gives precedence to domestic water use over agricultural use, to users upstream over downstream, and to oldtimers over newcomers.

Add the guidlines established by the

Dept. of Fish & Game for survival of natural wildlife and the situation becomes clear: There is simply not enough water to go around.

Eight years ago, for example, Domaine Carneros applied for and received the right to pump water from Huichica Creek, but has yet to pump one gallon. According to Steve Allen, vineyard manager, water cannot be pumped until the Dept. of Fish & Game is satisfied that the loss of water will not impact the survival of an endangered species, a freshwater shrimp.

Drought

The impact of the drought cannot be ignored. The water level in reservoirs and creeks is precariously low and wells are pumping the maximum.

Richard Brockmeyer, vice president of vineyard operations for William Hill Winery, reports that planting schedules for new vineyards have been slowed because of fears of inadequate water. "We're tapping our savings a little bit," he says. "We wouldn't want to do this very much."

Mike Crumley, Gloria Ferrer vineyard manager, claims herds of deer, in search of water, have come down out of the surrounding hills and grazed on 15 acres of one-year-old vines. A 12,000-ft. long deer fence costing $30,000 was built to surround the vineyard and protect the vines.

Mike Walsh, of Walsh Vineyard Management, is developing a new Carneros vineyard for Clos Pegase Winery. When a new reservoir failed to collect sufficient runoff due to extremely low rainfall, Walsh's crew resorted to hand-watering rootstock. Water was pumped from nearby Carneros Creek into a water truck, then transfered to a small water tank that could be towed through the vineyard to water the vines.

A saving grace throughout the drought has been the timing of what little rain has fallen. In 1990, three inches of rain fell before bloom and although it did not make a dent in water levels, it gave a natural boost to the vines at a critical point in their growth cycle.

It is too early to judge whether there will be any long-term effect on vines which are naturally drought-tolerant; so far, growers feel that grape quality has not suffered.

"If you had told me four years ago how little rain we'd get, I would have thought you were crazy," says Zach Berkowitz. "The vines look great. They are pulling through without any problems."

Unease is building, however, regarding the future of the water table. With no governmental regulation of groundwater, the risk of overtaxing the water supply becomes greater with each new well.

"Groundwater is like a bank account," says Eugene Boudreau, a geologist specializing in groundwater. "You can't draw out more than is there."

"It's the great American dream that the property owner has the right to do what he or she wants with the land," says Will Nord, vineyard consultant. "But at what point does the individual's desire become negative for the collective?"

Looking to the future

Faced with the possibility of water shortages, Carneros growers are looking to alternative sources, primarily waste water, to supplement existing resources.

Larger Carneros wineries such as Gloria Ferrer and Domaine Carneros recycle 100% of their winery waste water to the vineyard. All water passes through a series of aeration and storage ponds that feed into the irrigation reservoir.

Gloria Ferrer, for example, recycles upwards of one million gals/year, which is only a small fraction of its total irrigation needs.

Buena Vista Winery and a new Codorniu facility now under construction both have systems allowing reclaimed water to be pumped directly from the settling pond into the irrigation system, bypassing the irrigation reservoir.

Buena Vista, however, rarely uses the reclaimed water since the period when the water is available — generally during and immediately after harvest — is not when it is needed for irrigation. In addition, because the water is not mixed with runoff, algae often plugs the filters of the irrigation system.

The use of treated public waste water is a vast resource which is just beginning to be tapped.

Domaine Chandon is the first Carneros grower to sign a purchase agreement with the Sonoma Valley County Sanitation District to purchase 250 acre/ft/year of recycled waste water beginning in 1992.

It is likely that other growers will soon follow suit. ■

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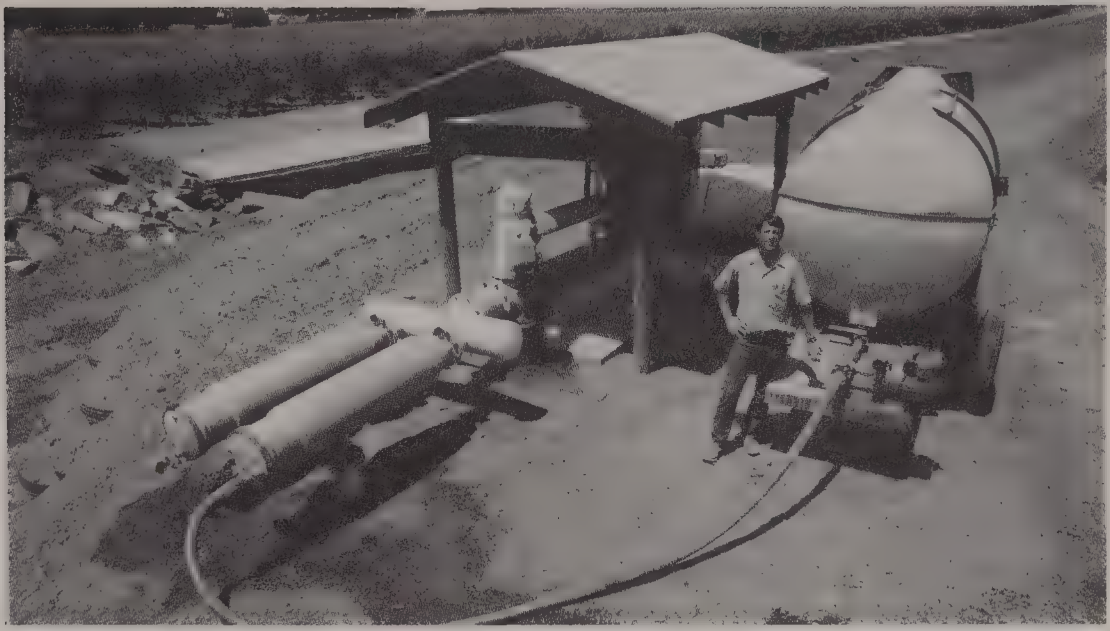
Advantages of fertigation

By Carole Taines



Jim Murphy operates portable injection equipment to add fertilizer to irrigation system at Murphy Ranch.

Fertigation, the application of fertilizer to plants through a drip irrigation system, was developed in Israel, as a tool to make the desert bloom. It has been tested internationally on crops as varied as apples and tomatoes, with good results.

The major advantages of fertigation, regardless of the crop are: 1) fertilizer can be applied efficiently to the root area of the plant; 2) quantity and frequency can be fine-tuned; and 3) both waste and cost are minimized.

Hal Carlson of Agro Tech, Geyserville, CA, has been recommending fertigation to northern California grapegrowers for eight years. Agrotech serves over 200 growers; only about 20 fertigate, although Carlson feels that with drip systems increasing, fertigation will be expanded.

Many Agro Tech customers are 'dry-farmers' who irrigate infrequently, perhaps once or twice each year — and Carlson doesn't recommend irrigating just to deliver the fertilizer. However, for those growers who have drip systems and a regular irrigation regime, Carlson suggests that fertigation is one of the most efficient ways to get fertilizer responses from vines. "You can apply any nutrient in a liquid form through a drip system," suggests Carlson.

All programs recommended by Agro Tech are based on soil and leaf blade analyses. Some people sample their own vines, but Agrotech also provides the service. All samples go to Harris Labs in Lincoln, NE, an established laboratory which does this type of analysis for customers world-wide.

If a grower is going to do his or her own sampling, Carlson suggests taking the samples around bloom. Usually, 30 to 40 leaves opposite fruit clusters are picked, put in a paper bag, and kept dry.

Petioles can be tested for nitrate nitrogen, and blades can be tested for total nitrogen, total phosphorus, total potassium, and other micronutrients. Because Carlson thinks leaf blades are more sensitive indicators of potassium deficiency, Agrotech only uses leaf blades, unless specifically requested to use petioles. The samples are dried in an oven, ground through a mesh screen, and subjected to various chemical tests.

Soil sampling can be done simultaneously with leaf sampling. However, more emphasis is given to the leaf analysis results, because there are often adequate amounts of nutrients in the soil which, for various reasons, are unavailable to the vine. For such problems, Carlson often recommends green manuring and liming in addition to fertigation.

Green manuring, by planting bell beans or other legume crops, is recommended for soils low (less than 1.5) in organic matter. Gypsum or liming is recommended for low pH soils or on soils with low calcium-to- magnesium ratios.

Customers submit their 'yield goal', the amount of yield they'd like to achieve for the particular vineyard. Recommendations are based on the plant and soil analyses, yield goals, and the optimum plant nutrient levels established by the University of California.

Nutrient recommendations are given that will result in 85%, 115% or 100% of the yield goal. The grower makes the final decision.

Deficiencies in petiole analyses for the following nutrients, according to A.J. Winkler, et.al. in *General Viticulture*, are as follows:

Nitrogen (important component of proteins, enzymes, and chlorophyll) less than 350 ppm nitrate N;

Phosphorus (important in photosynthesis and respiration) less than 0.15%;

Potassium (important in enzymatic activity, translocation and stomatal functioning) less than 1%;

Magnesium (important constituent of chlorophyll) less than 0.3%;

Zinc (important in auxin synthesis) less than 15 ppm.

What nutrients are northern California grapegrowers typically using in their fertigation programs? "Basically, many vineyards are deficient in potassium (K)," responds Carlson.

"In many cases, deficiencies in the vines result from soil deficiencies. In much of Sonoma County, the soils are shallow, porous sandy loams. In areas of high rainfall, many of the nutrients in the soil are lost by leaching. Conversely, there are some clay soils in which the nutrients are plentiful, but are bound up and unavailable to the vines."

Deficiencies in K are common due both to low levels of K in the original soil parent material and cropping history. Grapes once were a secondary crop in Sonoma County, tree fruits and grazing land for cows were more important. These crops further depleted the soil's fairly low reservoir of K. Grapes have a great demand for K.

Carlson feels that the vine's need for K is more critical to grape quality than its need for nitrogen (N) or phosphorus (P). "Nitrogen problems are much easier to fix. Also, you can bring the N up and get good growth but still have inadequate maturity and yield if the K is not at optimum levels.

"Phosphorus problems are probably more prevalent than we know. Many of the red-phased iron soils in the hills are probably P-deficient, which may be limiting quality in ways we are unaware of."

Agrotech offers four liquid formulation products, all high in K: 2-0-12, 2-4-10, 0-0-12, and 6-3-9. The 2-4-10 and 6-3-9 are most commonly used in young vineyards. (Numbers represent the ratio of nitrogen to phosphorous to potassium.)

Generally, program formulations start with K, which is the hardest to get into the vine, and the other nutrients are manipulated up or down accordingly. With today's practices of vineyard management, much lower amounts of nutrients are needed than in the past.

Several years ago, many applications, particularly of nitrogen, were made in the winter by broadcasting the fertilizer and letting the rains wash it in. Also, fewer vineyards were clean-tilled so there was more competition for nutrients.

Many nutrients, particularly nitrogen, which is very mobile in the soil, were leached and long gone when the vine's root system became active. As a result of these factors, recommended fertilizer amounts were far higher than would be appropriate today.

"Today, applications are made during the growing season while the vines are active and post-harvest before they go dormant, and they are often dripped in or fertigated," says Carlson. "There is much more control this way."

Most growers fertigate in three or four applications over the season, while some prefer small, continuous applications throughout the growing season. This is 'spoon feeding' rather than 'slug feeding' and it's another innovation developed by the Israelis.

Below are several evaluations of the pros and cons of fertigation.

Sangiacomo Vineyards

Angelo Sangiacomo and his family farm about 900 acres in the Carneros district and 45 acres in Rutherford. In addition, they have recently planted about 100 acres near Lakeville Rd. in Petaluma.

Most Sangiacomo vineyards produce Pinot noir and Chardonnay grapes, which are sold to about 35 wineries in Sonoma and Napa counties. The majority of the vineyards are cordon-trained and are on AXR-1, St. George, or SO4 rootstocks.

About 150 acres in the Carneros are under fertigation. These vines are on shallow, light soils. Some of the acreage was interplanted to 12×3.5 from an original 12×7 spacing. Sangiacomo developed a more intense fertilization program for the new interplanted vines, for fear they wouldn't grow because of intense root competition.

The drip system was already in place, with emitters delivering ½ to 1-gal/hour per vine. A new emitter was installed at every new vine in the interplanted acreage. The emitters are located about 18 inches from the vine trunk.

Irrigations are scheduled by neutron probe, vine appearance, and weather variations. An average irrigation set is 10-gal/vine. Irrigation usually starts around June and continues until three weeks before harvest.

Leaf and soil analyses are done around bloom. The most common deficiencies are N and K. N is applied through the drip system, as calcium nitrate. Currently K is hand- or machine-applied as a solid, although Sangiacomo thinks they will eventually apply it through the drip system.

"We make changes here slowly," says Sangiacomo. "We aren't big users of fertilizer in general, usually just twice each year and small amounts before budbreak and after bloom. Many of our vineyard blocks are never fertilized."

Sangiacomo thinks fertigation is easier and less expensive than other methods, although he sees no real response advantages. If other vineyard blocks on drip begin to show deficiencies, such as low vigor (too little N) or leaf scorching (too little K), he will probably fertigate them. He has had no problems and sees no disadvantages with fertigation.

Murphy Ranches

The Murphy family, of Murphy Ranches and Murphy-Goode Winery in the Alexander Valley, has 300 acres under fertigation. These vineyards are planted to white grape varieties on the valley floor. Most of their red varieties are on hillsides and are not fertigated.

Vines planted on gravelly, shallow soils were experiencing stress. The Murphys went from overhead sprinklers to drip, but the vines remained stressed. In 1982, Francois van der Spuy of Crop Production Engineering suggested burying the drip line. The tubing is buried one foot below the surface, with emitters three feet apart delivering 1.32-gal/hour per vine. Fertigation is now being done with this system.

Irrigations are scheduled by neutron probe readings. The Murphys intend to eventually have their irrigation and fertilizer programs entirely computerized, such that when a particular block's moisture level is below target, the system will automatically deliver the needed amount of water.

Agrotech does leaf sampling for the Murphys. Samples are taken at bloom and during the growing season. The leaves have extremely substandard K levels, but N and P are satisfactory. Occasionally, sulfur or magnesium deficiencies occur. The typical formulation applied through the drip system is 0-0-12.

Previously, the Murphys made three or four applications/year of about 30 gal/acre of liquid fertilizer formulated for their vineyards. In 1989, they did six fertigations at a lesser rate of 10 to 20-gal/acre. "We are gradually approaching hydroponic farming, where we might irrigate every day from 1 to 3.5 hours/day," says Jim Murphy. "We will decrease toward harvest and according to weather conditions, but will continue right through until the rains come."

The Murphy's vineyards are still somewhat low in K, but the quality of the fruit has increased tremendously. It's ripening earlier and more uniformly. In addition, blocks with heavy and lighter soils can be harvested at the same time.

"As K levels improve," adds Murphy, "we're seeing improvement in the uptake of other nutrients. Fertigation gets the fertilizer right to the roots."

Other effects include more uniform cane lengths, increased trunk diameters, and increased yields. Murphy also claims the grapes have more pulp and less juice.

Murphy estimates it has cost $50/acre to increase yields 20% to 25%. They leave more canes at pruning, with an the increase in yield of about one ton/acre, without sacrificing quality.

The problems Murphy has experienced with the system are actually more directly related to the buried line than the use of fertigation. "Roots tend to grow near the emitters and clog them," says Murphy. "We're alternating applications of phosphoric acid and Treflan in the area surrounding the lines, and this seems to work OK."

Dieden Vineyard

In the Dry Creek Valley, Walt Dieden farms about 13.5 acres of Zinfandel. The vines were planted in 1976 on AXR-1 rootstock, spaced 8x12. They are cordon-trained and the soils are 'mixed riverbed' rock and gravel. The grapes are sold to

Beringer Winery.

All fertilization has been done through the drip system since 1979. The emitters deliver about 1-gal/hr per vine, and there are either one or two per vine.

Fertigation is scheduled by leaf analysis done by Agrotech in late spring or early summer. Deficiencies are fairly consistent from year to year. Nitrogen and phosphorus are usually adequate. However, there is a large deficiency in potassium and, occasionally, some zinc and magnesium is required.

About 100 gal/acre of the 0-0-12 formulation is typically applied to each of three sections of the vineyard. In 1989, fertigation was done in April, July and November. Soil analysis is done periodically for comparison to the petiole analysis.

Irrigation scheduling depends on the year. Dieden usually starts after good leaf-out, with sets of 24 hours/acre every three weeks, and continues until three or four weeks before harvest.

"Fertigation is used for optimum quality," reports Dieden. "It's not required to achieve good yields or maturity from my vineyard. Soil amendments such as gypsum have helped make the soil nutrients available to the vines. We cluster-thin extensively. In 1989, we got about six tons/acre of small, dense, profuse clusters."

Cadd Vineyard

Alvin Cadd farms 45 acres of Pinot noir, Chardonnay, and Sauvignon blanc in the Alexander Valley. The vines were planted in 1970 in alluvial soils ranging from sandy to gravelly loam. The grapes are sold to Belvedere Winery, Piper Sonoma, and White Oak Winery.

The vineyards were converted from apple orchards, which had overhead sprinklers. The drip system was installed seven years ago. There are two ½-gal emitters/vine spaced 18-inches from the trunk. On the heavier soils, the vines have only one emitter.

Tensiometers, gypsum blocks, and visual symptoms are used to schedule irrigations. Cadd usually begins in May and continues until three weeks before harvest, applying a four-hour set every other day, adjusting slightly with weather changes. He cuts back before harvest, but makes sure the vines have adequate water and don't become stressed.

Fertigation is scheduled by leaf analysis at bloom. Cadd's vineyard is consistently low in potassium, with nitrogen and phosphorus being within normal range. The typical formulation applied is 2-0-12. Occasionally, the vines need zinc.

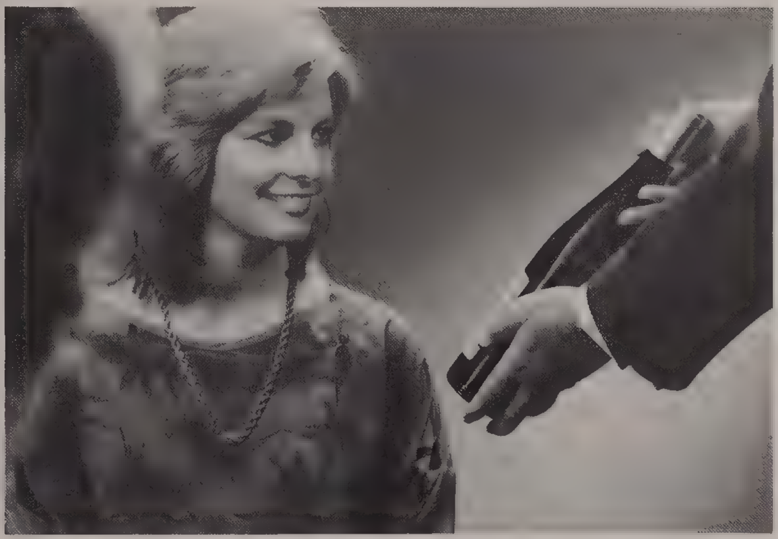
There are four applications usually, starting at bloom and ending at harvest. Three of the applications are by fertigation; the last is shanked in.

Indicators other than leaf analysis are used to determine nutrient needs. For example, Cadd had difficulty finding good renewal wood on the Pinot noir vines. Despite the fact that petiole analysis showed nitrogen wasn't deficient, nitrogen addition corrected the problem.

Ease of operation and efficiency are the advantages of fertigation. "You get the fertilizer right where you want it," says Cadd. "You don't have to go over the ground with tractors, which compact the soil."

Pope Vineyards

Mike Wolf manages about 725 acres for Pope Vineyards in Pope Valley. The vineyards are planted mostly to Chardonnay, Sauvignon blanc, Zinfandel, and Caber-



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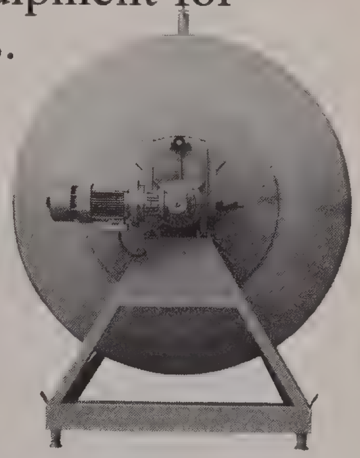

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net Sauvignon with small amounts of other varieties. The oldest vines were planted in 1978. All vines are being converted to a quadrilateral cordon-training system.

By 1985, 100% of the acreage was fertigated. There are two 1/2-gal/hr emitters installed per vine. Because the large acreage has tremendous variation in soil types and vine crop load, emitters are added or removed as needed.

Irrigations are scheduled using evapotranspiration (ET) pan data, formulas, tensionmeters, weather, and vine condition. Fertigation is usually started before budbreak and finished by early July.

Wolf has always scheduled fertigation by leaf analysis at bloom time, plus using visual symptoms and the vineyard's history. In 1989, Professor Ben Ami Bravdo of Israel, a drip irrigation specialist, visited and suggested Wolf fertigate more often. Fertigation was increased on rootstocks and there were tremendous results, so he is moving toward applying continuous, small amounts, *i.e.*, the 'spoon-feeding' approach.

The need for N has increased since trellis conversion began. N is added as calcium nitrate through the drip, about 25 to 30 lbs/acre during the season, in five or six applications.

A calcium/magnesium imbalance in the soils adversely affects the K availability to the vines, so gypsum is added to the irrigation water. The gypsum stimulates root activity and improves K uptake by the vines. The potassium, however, is purchased as a solid, and they make their own liquid formulation.

"Fertigation is efficient, economical and easy to control," says Wolf. "The vines are in a better state of health. One disadvantage is occasional impurities in the fertilizers, but these are always caught at the screen filters before they reach the emitters. If I had to do it over, I would put the filter coming right out of the tank."

All new acreage at Pope Vineyards will be installed with both sprinkler and drip systems, and all fertilization will continue to be done by drip.

Baritelle Vineyard

John Baritelle has 63 acres of Cabernet Sauvignon in Napa Valley and sells the grapes to Beaulieu Winery. The vines were planted in 1972 and were originally on AXR-1. In 1979, Baritelle discovered and Dr. Jeff Grannett of UC Davis identified phylloxera damage. Dr. Pierre Galet of Montpelier, France confirmed that the rootstock was AXR-1. This was the first instance of what many believe to be a Biotype-B phylloxera infestation in Napa County. In 1986, replanting began with 039-16 rootstock.

Because infrared photographs showed an oblong pattern of spread in the direction of the rows, Baritelle suspected that cultivation was spreading the phylloxera. Fertigation was begun in order to keep shanks and equipment out of the soil.

Two ½-gal/hr emitters are installed per vine, spaced 18 inches from the trunk. Tensiometers, gypsum blocks, ET-formulas, and visual symptoms are used to schedule irrigation. Irrigation usually begins at the end of April, or in early May, and continues in alternating weeks, in 12-hour sets, through harvest, based on the weather.

Some scheduling is determined by pumping cost. There are two 400-foot deep wells which are expensive to pump from, and electricity rates are lower on weekends. There is also a drain-tile system which returns runoff to the Napa River and can be pumped up again during the latter part of the growing season.

Fertigation is scheduled by leaf analysis at bloom. The vines always require potassium, a little nitrogen, and occasionally zinc. K appears to be tied up in the soil, and vines were defoliating before harvest.

"When K was added by broadcasting, the vines still lost leaves," recalls Baritelle. "But after using fertigation, it never happened again. Plus, I estimate I'm using 50% less K and N with fertigation."

Baritelle suggests having soil analysis done, particularly during drought years. The long-term effect of fertilization is acidification of the soil, which lowers the pH. If there is less rainfall, there will be less leaching, and the acidification will accelerate.

"This is another reason to fertigate," adds Baritelle. "The drip distributes the fertilizer directly to the vine root area, and pH problems are lessened."

For those intending to use fertigation, Baritelle recommends obtaining reliable people who understand the vineyard's

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More details in **PWV** Calendar, page 50.

water chemistry. "But that is not enough," says Baritelle. "Ride the lines and check for problems yourself. Know your vineyard!"

Practical tips

Most of Agrotech's small customers rent the necessary fertigation equipment. Hal Carlson suggests that a ranch with 20 acres or more can justify the purchase of a permanent system, which costs between $1,500 and $2,000, including tank, pump and fittings. Mathematical calculations can be used to determine the size pump and injection system required.

Other important considerations are the customer's water quality and the choice of emitters and filters. One problem would be water high in calcium. If phosphorus is added to this type of water through the drip system, a milky precipitate of calcium phosphate will result, clogging the filters.

Carlson routinely gets samples of the customer's water in advance of installation and tests for precipitates by adding various representative fertilizer formulations. If there are problems, modifications can be made. For example, fertigating more frequently at lower concentrations.

It's important to use pressure-compensated emitters to ensure even fertigation and water distribution. A self-flushing or 'sneezer' valve is recommended, which will open if the pressure rises to unacceptable levels and blow out anything clogging the system on the ground. When the pressure drops, the valve automatically closes.

Filters that are too fine can also cause problems. Many formulations, particularly K, have microparticles. Ideally, the injection system should be located downstream from the main filter. Carlson suggests an auxiliary filter no finer than 150-mesh, which will pick-up impurities in the line.

If a finer filter is used, a slimy film will hang up on the filter screen or sock, causing a change in pressure within the system, which will in turn change the concentration of the fertilizer being injected.

Carlson advises running the system for ½ to 1-hour before injection. There will be better fertilizer absorption with wet soil. Use about 30% to 40% of the total time left for flushing with clean water to get the fertilizer off the soil surface. That means about 60% of the total set time is devoted to getting the fertilizer on.

"Most people find the first year of a fertigation program to be the most expensive," says Carlson. "Thereafter, you spend about 25% less than year one, on a yearly basis. Eventually, you get down to maintenance costs."

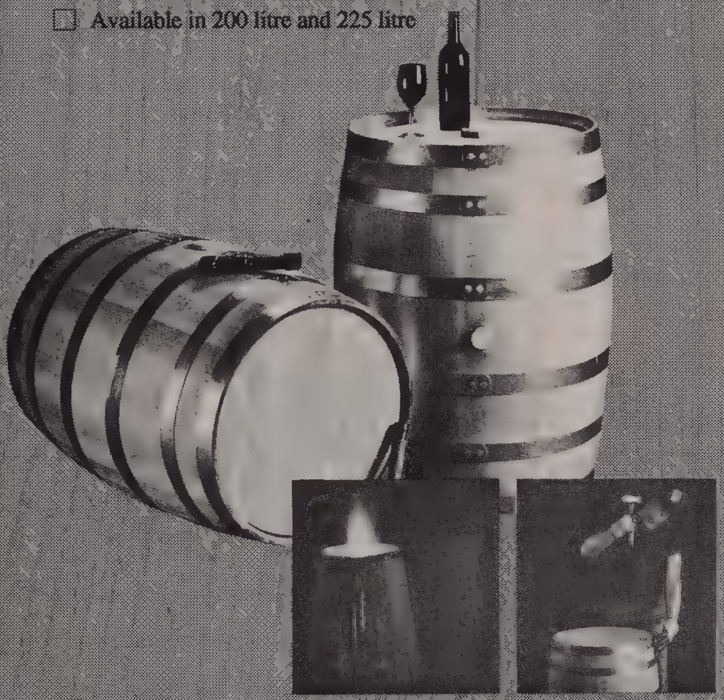
Nutrition evaluation

James R. Brownell, Ph D., with the Department of Plant Science and Mechanized Agriculture at California State University, Fresno, recommends the following vineyard nutrition management:

Nutrition evaluation should be a part of routine vineyard management. Petioles from opposite the bunches, sampled at bloom and analyzed for NO_3-N, PO_4-P and soluble K, will provide a measure of nutritional status at the beginning of the fruit production season.

Petiole sampling should also be done just prior to harvest, if N, P, and K are the only nutrients in question. But leaf blades would more commonly be the

Continued on p. 44



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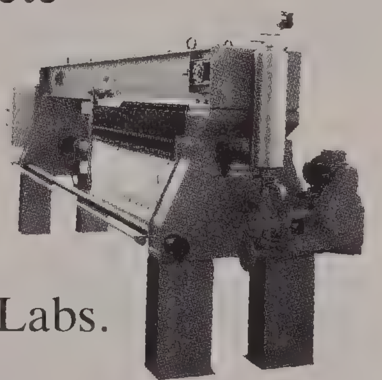

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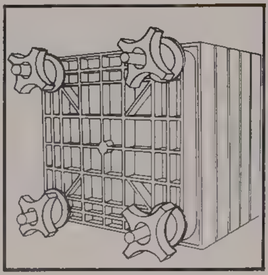

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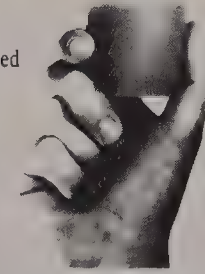

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Continued from p. 41

best sample tissue, analyzed for total N, P, K, Zn, B, Na, and Cl. The location of sampling collection at this time is still debated. Brownell recommends collecting leaf petioles and blades from recently matured leaves on a normally growing cane for any sampling other than bloom.

These two samplings, collected to represent each production unit, are the minimum required to 'know your vineyard' (KYV).

An additional sampling at verasion can supply information about nutrition during the growing season. With a sampling and analysis system established, the data needs to be arranged and stored, so that, levels from previous years can be easily compared to the current year — another aid in KYV.

In vineyard management, Brownell mainly uses soil samples to evaluate: The impact of new tools (drip irrigation and fertigation) on historic problems; Conditions before establishment of the vineyard; Salt management, where soils were saline; Acidity, where that was or could be a problem; etc. Vine roots explore too much of the soil to permit reasonable cost sampling, and aid in KYV.

Walking of the vineyard to collect samples aids in KYV. The sampling should be done by vineyard personnel. The expense required can be treated as an investment in the process of KYV.

Drip irrigation, tissue and soil analysis, record keeping, setting yield and quality goals are all tools needed for optimum vineyard management. Used well, they all help. No one of these is **the answer** to all vineyard management problems. ■

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GRAPEGROWING

Evolution in Burgundian viticulture

By Don Blackburn

Old French saying:
"Plus ca change,
plus c'est la meme chose."
(The more it changes,
the more it's the same.)
Translation:
Don't try to understand 'em.
Just rope 'n throw 'n brand 'em.
RAWHIDE

In A.D. 440, the Huns moved west into the Rhine valley, displacing the Burgondes, who had preceded them. The ousted tribe settled in what is now eastern France in 443. Since then, little has changed.

The evolution of Burgundian wine has been continual, yet we have no guarantee that the Burgundies made today are more satisfying to their consumers than those produced under the Roman Occupation, during the Babylonian Captivity, or in the reign of Louis XIV.

There certainly is better equipment today. In 1750, the state of-the-art winemakers at Clos Vougeot used an egg to measure must density. They would have admired the precision and consistency of our refractometers.

In 1868, Monsieur Vergnette-Lamotte wrote of his experimentation with an 'optic saccharometer'. Noting unsatisfactory results with his prototype models, he nevertheless predicted a time when all wineries would use the "optic activity of the juice to measure sweetness."

From this broad viewpoint, bounding through history, let me draw my first conclusion summarizing Burgundian wine-growing experience: The major issues with which wine-growers wrestle remain consistent from generation to generation, whether it is equipment reliability, worker turnover, or colloidal stability.

Climate

About half of Burgundy's 28-inch average annual precipitation falls during the growing season. Crop set is often compromised, because June is the second wettest month of the year. July and August are not always sunny enough to assure adequate ripening before the beginning of the October rains.

Experience shows that the accumulation of daily maximal temperatures during summer is more crucial to crop quality than is the sum of daily mean temperatures. Very few seasons are completely free of any setback, be it frost, hail, or simply an inopportune ten-day rain spell.

The climate data may be of interest to growers in other regions, but these numbers are difficult to interpret for application elsewhere. The overriding wisdom is that scions, rootstocks, site locations, and vineyard lay-outs should be chosen to mature the grape evenly over the entire growing season.

If the crop ripens long before the end of the growing season, it tends to encounter late season hot weather, which is detrimental to sugar/acid balance and flavors.

Soils

The sedimentary soils of Côte d'Or bear varying amounts of $CaCO_3$ and clay. It is not currently possible to convincingly relate the A.O.C hierarchy to numerical data taken from soil structure, texture, or micro-nutrients.

Indeed, it does not seem appropriate to dwell on this, hoping to unlock exportable secrets. Instead, as we look to Burgundy for ideas, we should identitfy the factors which appear relevant to our own settings.

Growers point proudly to an abundance of surface stones in their hillside vineyards as a sign of quality. They may fail to mention that these stones have contributed to the cessation of soil tillage in favor of chemical weed control.

Clay accumulates at the foot of the slope while erosion exposes the stones farther up. Vigneron lore holds that vines grown in clay produce rich wines, whereas those grown in 'warmer' soils yield more 'elegant' wines, which go from lean to thin as the hill crest is reached.

If contours were drawn to chart the gradient of a proper balance between a wine's body and elegance, it would dip far down into the clays at sites such as Bâtard Montrachet and Clos Vougeot. At these spots, the Grand cru location is characterized by more clay than is the norm. So, the progressive erosion of soil elements down slope is not sufficient in itself to explain why Burgundies vary so obviously over small areas.

The different types of limestone formations play a role in soil structure, which affects permeability and is differentiated by the characteristic ways a given rock type breaks up. Soil permeability has a great influence on drainage and therefore on soil moisture and vine physiology.

Soil nitrogen is a known contributor to excessive vigor, so its addition is as widely criticized as it is common. The vine is not a plant with a high nitrogen requirement. Potassium has been a popular amendment for the last generation. Its abuse has led to pH problems in wine.

Phosphoric acid has been the least-criticized mineral fertilizer, perhaps because it is more difficult to overdo than the others. Red grand cru vineyards appear to have a naturally higher level of phosphoric acid than do nearby soils.

Soils in Côte d'Or are calcium-rich due to the presence of limestone, but they rarely match the calcium concentration found in the heart of Champagne and Cognac. In all three regions, the first criterion for rootstock is its ability to thrive, *i.e.*, to resist choloris in a calcite soil.

Of the trace elements, manganese is the major presence in soil and wine. Also, molybdenum, magnesium, and strontium are efficiently assimilated, wheras barium and rubidium are not utilized. The addition of certain trace elements has been shown to improve wine quality in Côte d'Or, but there is no research to indicate that such benefits are obtainable in all vineyard sites.

Vine Varieties

Pinot noir constitutes a much more diverse group of strains than do most viniferas. It is the origin of the entire Pinot family, which includes Pinot blanc, Pinot meunier, and Pinot gris, among others. On the whole, the members of the Pinot family have similar physical attributes, except for berry color, which is the feature that distinguishes them.

Typical of Pinots is a small cyclindrical cluster, an unevenly lobed leaf, and a splayed growth habit. Pinot droit ('straight-growing' Pinot noir) has an erect growth habit which facilitates operations in Burgundy's tightly-spaced vineyards. However, Pinot droit often shows the traits of a Gros Pinot ('coarse Pinot'), a vulgar relative of Pinot fin ('fine Pinot').

The best Pinot noir wine usually is made from Pinot fin or Pinot mi-fin ('half-fine Pinot'). The latter has somewhat less lobing, larger and more numerous clusters, and is more likely to be a Pinot droit. Gros Pinot is even more decadent. It overcrops and yields simple wines.

Recently, I was discussing this subject with several California Pinot noir producers when one said, "I don't care about lobes and leaves and stuff like that. I only care about the grapes."

In fact, leaf shape, cluster shape, and growth habit do not directly influence the wine as much as they indicate which strain of Pinot noir one has. The type of strain is critical to wine quality, especially in Pinot noir. The importance of vine genetics lies in its influence on vigor, fertility, and ripening.

It should be noted that the use of the word 'clone' is best reserved to convey its proper meaning—the asexually generated progeny of a single organism. Vine types such as 'Wente Chardonnay' or 'Pommard Pinot noir' are perhaps best called 'selections' when they are intentionally propagated. The naturally occuring sub-varieties are best called 'strains'.

Chardonnay is more homogeneous than Pinot noir, but its existing variations are noteworthy. A number of Oregon winegrowers feel that their major limitation in Chardonnay production is more a question of strains than of climate or enology.

As more American growers become familiar with ampelography (grape vine identification), more report that they have an abnormal form of Chardonnay, whose main features are excessive vigor and fruit production, and a track record of clumsy, short-lived wines. Chardonnay musqué is an aromatic mutant fitting the above description. Some consumers like the wine it produces.

Vineyard Practices

"Old vines, poor soil, little fertilizer." Thomas Jefferson noted this Burgundian saying in 1787, and it is still repeated today. Yet it is becoming more difficult financially to maintain an old vineyard (beyond age 40) in Côte d'Or or elsewhere in France.

A 50-year-old vine seems healthy if the vigneron is aiming for two tons/acre, but growers now think in terms of double that. Second, certified material is a tempting reason to replant. Even as they submit to these modernization pressures, growers sense they are losing something. As one diehard said to me, "You know, young vines have all the advantages, every one . . . except quality in the bottle."

All growers, traditionalists and modernists alike, maintain a replanting program. The primary goal is to avoid getting to a point where one's profitability is compromised by decrepit vineyards with low yields. The obvious ideal is to replant a portion of one's holdings every few years, thus maintaining a progressive turnover.

The best winegrowers try to roll over a vineyard generation every 50 to 60 years, wheras their neighbors may be happy with 35 to 40. The old vine component can make a big difference in a consumer's reaction to a $50 wine.

Another way to infer a lot about a grower's attitude is by his choice of rootstock. SO4 is the most popular today. It imparts somewhat more than moderate vigor and fruitfulness, thrives in most places, and was the first certified stock commercially available.

SO4 is a decent, all-purpose variety, but its wide use has contributed to current problems with overproduction. SO4 certainly is much more conducive in Côte d'Or to high quality than higher-vigor stocks such as Rupestris St. George, AXR-1, and 5-BB.

It is sad to see growers get away from choosing rootstock as a function of the site. After all, wines made from SO4 vineyards didn't begin to appear until after World War II, well after 161.49C, 3309C, and Riparia Gloire had proven that grafting would not be the undoing of Burgundy. The decreasing number of rootstocks may mean that many vineyards will have a stock less than ideally suited to its needs.

Spacing

In Côte d'Or, vines were closer together in the past than they are now. Spacing has increased toward the current one meter by one meter to make room first for the horse and then for the tractor. Today, 10,000 vines/hectare (4,000 vines/acre) is the legal requirement, one that is not seriously challenged.

Vignerons and agronomers feel that high density leads to lower vigor and narrower foliage, which ventilates the clusters and minimizes shading. High training (6 to 7 ft vs. 3 to 4 ft) is experimental and is being considered only for the lowest appellations. Moreover, it can't be used with tight spacing, because rows are so close the tractor must straddle them as it passes.

Vine Vigor

Vine vigor is the major thread connecting Burgundian viticultural practices. Once it is set by site selection (habitat), vine genetics, soil management, and spacing, it imposes itself on the many aspects of vine physiology and remains the focal point of the life of the grape.

Vineyard practices should be carried out so as to regularize vigor from year to year. Vigor in excess of that required to achieve grape maturity at the end of the growing season should not be encouraged. The necessary energy pool includes, however, a latent reserve dedicated to sustaining shoot growth the following spring, until the vine has adequate foliage for substantive photosynthesis.

The best time to prune is between January 1st and budbreak. During this period, the canes have a minimum of stored nutrients, the reserves having migrated to the permanent organs of the vine. In warm climates, high vigor vines may be tamed by a pruning soon after harvest. (This may also be appropriate in some Burgundian vineyards!)

'Apical dominance' is the phenomenon of upward sap movement favoring growth at the farthest points from the roots. The pruner should thus place the fruitful wood so as to guarantee it a high priority sap flow. For example, a cane will show diminished growth and fruitfulness if a spur is left above it. Pruning must respect and reflect the vigor of the vine.

Upward training of shoots keeps them out of the lane, thus facilitating tractor passage. A pair of mobile wires keeps the shoots growing vertically. They are unclipped after harvest so they can be dropped to the ground, out of the way for pruning. They are secured only at the end of rows.

Trimming of shoot tips is unavoidable, but given the small number of clusters/vine, the remaining foliage is adequate. It is noteworthy that interrelated factors —spacing, low training, and severe climate—combine to give the vigneron both a workable context and a limited degree of latitude in his actions.

Suckering and shoot thinning are essential on these small, tidy vines. On the other hand, cluster thinning is considered too risky due to the unpredictable climate, which can cause crop losses anytime fruit is on the vine.

Common opinion is that quality is managed by controlling vigor, not by suppressing its symptoms, such as excess yield. A Burgundian would say, "If I get into trouble with overcropping, I'll cut back on fertilizer next year, but I won't put grapes on the ground."

Powdery mildew is seldom encountered in Côte d'Or today because growers prepare for it—almost as an afterthought —in tank mixes of various fungicides. The most virulent pathogens are downy mildew, mites, caterpillars, and, increasingly, *Botrytis cinerea*, which is developing resistance to fungicides. Moreover, higher vine vigor has made grapes more susceptible to infection.

Frost is not currently a common problem in Côte d'Or, but it could return with the cycling of climatic trends. Hail periodically slashes finely delineated paths through the vineyards—it has to be seen to be believed. Some years ago, in June, I saw hail strip a vineyard. No leaves or grapes remained, just stubs of young canes. The damage lasts several years. Certain areas are hit often enough to be called 'hail corridors'.

Viruses are a major problem, one that helps explain the enthusiasm for soil fumigation and clonal selection. Now that newly certified Burgundian clones are being introduced into the New World, it will be interesting to see whether those that perform best in Burgundy also do so in other settings.

'Growth stoppage' in the vine usually occurs within a week of veraison. After this point, the vine can dedicate more resources to ripening. Vigor is a factor here too: moderate vigor will favor a cessation of growth soon after the foliage becomes adequate for the requisite amount of photosynthesis. Vintage quality can be directly related to the date of growth stoppage.

Ripeness

Much has been written about what constitutes a ripe grape. The criteria which winemakers consider are as varied as the range of stylistic preferences. In general, the Burgundian looks to maximize the grape's sweetness before bad weather sets in. Few make pH a central factor. Titratable acidity can be dealt with (by illicit tartrate addition) after crushing.

Winegrowers in warmer climates have very different concerns at harvest, so we need to look beyond sugar and acid to the more relevant issue of 'juice yield'. This does not refer to the efficiency of a given press, but to the percent of extractable juice contained in a kilo of grapes.

The Beaune Enological Station annually carries out a standardized pressing of samples from target vineyards throughout Côte d'Or in order to determine for each vintage the average juice yield for each variety. Top-rated vintages are those whose average juice yield is 60% to 70%. Wines felt to be thin and dull tend to correspond to juice yields of over 70%.

Horizontal screw presses are still common in Burgundy, although pneumatic presses are gaining ground, especially where whites predominate. Many Burgundians follow the existing tradition of pressing whites with the stems. I have not found that this practice— in Côte d'Or, at least—results in the extraction of perceivable bitter elements.

Some growers—perhaps less than half —ferment Pinot noir with a percentage of the stems. Twelve to 24 months usually suffices to dissipate stemminess. The widely-held notion that stems in Burgundy are lignified (making them usable) is false. They turn woody only when a unicorn licks them.

Quality

Chaptilization is alleged to be the bane of today's Burgundies. In fact, the practice goes back at least 200 years, a period encompassing the Golden Age of Burgundy. The need to add sugar to the must results from weather conditions outside the control of the viticulturist.

Given the uncertain climate of Côte d'Or, it is understandable that even the best growers need to supplement grape sugar in most years. We should assume that the majority of the Burgundies we have greatly enjoyed were chaptalized.

The real cause of the recent quality slide is none of the previously mentioned factors. Rather, it is the willingness of the market to accept boring wines at insanely high prices. The discretion of the consumer has always determined how dedicated the producer is to making the best wine possible.

When a grower keeps his oldest vineyards as long as possible, goes easy on the fertilizer in all vineyards, and plants good strains of Pinot noir and Chardonnay, his own pride and respect for the consumer are pushing him to make decisions in favor of quality.

Let me look beyond the perspective of Burgundy to draw a conclusion about the origin of quality, the topic that has been the underlying theme of this series since it began in January, 1985.

Hygiene, science, and hard work are important ingredients in the production of good wine, but the quality potential of the grape is a limiting factor that can override them.

Moreover, the foundation is laid for the construction of a quality wine before the first grape is harvested, before the vine is planted, even before the site is chosen. What constitutes this starting-point is the vision of the winemaker, which is manifested in an ability to establish a sequence of steps, from site selection to label design, that leads in a

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straight line to the creation of a wine's character.

Every change of course causes a loss of time, money, and wine character. It may be as understandable a mistake as choosing the wrong exposure for a variety that is otherwise planted in the right location. Until you realize your mistake, all subsequent decisions relating to those grapes will be misguided.

Experiments are not excluded from the 'straight line' theory, because one needn't commit too much to such efforts. Ideally, such experiments help us straighten out the line and make the overall method consistent. The result is a wine that makes sense to the consumer.

The winemaker is free to draw the line as he/she sees fit, even when no one else has identified the same starting and ending points. Thus, the winemaker may contradict everyone else. But, 'Grand vin', in the French sense, results only when the winegrowing method does not contradict itself.

Final Note

I have one suggestion for the Burgundians. I propose a change in A.O.C regulations to increase the percentage of old vines throughout Côte d'Or. Currently, when a vineyard is torn out, a grower must wait until the replanted vines are four years old, at which point the grower regains the right to use the vineyard's appellation.

I suggest that when a grand cru vineyard is replanted, it be limited to appellation 'Bourgogne' from age 4 to 6, appellation 'Village' from age 7 to 10, appellation 'Premier Cru' from age 11 to 14, and 'Grand Cru' after that. Thus, as the vineyard improves with advancing maturity, it would ascend the appellation hierarchy to resume its proper place when its wines are (perhaps) worthy.

Under such a procedure, tearing out a grand cru would cost the grower 15 years, a premier cru, 11 years, and so on. A production of two tons/acre in "that raggedy old plot" might not then look as paltry as it does now. ■

Editor's Note: If there is sufficient interest, this four-year series of articles on Burgundian wine-growing may be reprinted under a single cover. Those who would like to be informed of such a publication should send a note to *PW&V.*

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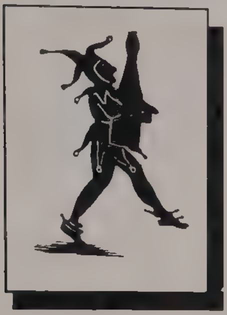

with Jake Lorenzo

Do you ever think about poets? Jake Lorenzo does. Poets somehow wear their emotions outside their skin. The normal pummeling of day-to-day living becomes excruciating torture that forces them to scream their poems onto paper. Nowadays, of course, no one reads poetry.

If Jake Lorenzo writes a poem and no one reads it, is Jake still a poet?

Alcohol is the beverage of choice among poets. Wear your emotion on the outside and you don't need cocaine or uppers. No, rather a day full of beers, a few bottles of wine to cool the burn, to anesthetize the pain.

Dylan Thomas was a poet, a great one say many. I know for a fact he was a great drinker. There are those who say that drink killed Dylan Thomas. Jake Lorenzo isn't one of them.

In detective novels and movies, the poor detective is always stuck in some intricate labyrinth of intrigue and cunning. He spends his time negotiating the corners and dead-ends like a mouse in a maze, until he pops out the end and everything becomes clear.

Real life for the detective isn't like that at all. Usually, you start out knowing who's guilty. You know who's cheating on his wife. You know who embezzled the money. You know who stole the car. All the detective needs to do is be patient and get some proof.

That's why Jake Lorenzo is selective about what he reads and watches. It seems to me the most fascinating stories are about integrity. You know, a guy starts out with a dream. The dream rubs up against reality. The guy compromises and slowly turns into the very thing he hates or he stays true to his dream and ends up being crushed by life, but able to look at himself in the mirror.

If a man has a dream, but upon awakening can't remember it, is it still a dream?

I guess it's the arrogance of detectives to think we always know what's going on. If we don't know, we're sure to figure it out later. That's what accounts for the swagger in our voices.

Booze is still the beverage of choice among detectives. Know all the answers and you can afford to belly up to the bar and have a shot of whiskey (and the occasional tequila).

Jake Lorenzo is a detective, a great one say many. I know for a fact he's a great drinker. There are many who call Jake a wimp because he just drinks wine (and the occasional tequila), but don't say it to his face.

The wine industry was like a dream. That's what attracted me to it. It was idealistic young men and women deep in the dirt of hard work, drenched with the sweat of inspired labor, and higher than kites on the possibilities of their magical product.

No one was too poor to risk the challenge, too tired to put in the hours, or too inexperienced to make the damn thing work.

Wine was the beverage of choice, and the industry made it, drank it and reveled in the heady, intoxicating wonder of building something from nothing. It was joyous and it was successful. It was people dedicated to making a better product each and every year by working harder each and every day. It was the best thing going in American industry. Jake Lorenzo was delighted just to be close to it.

Success brought change. The dream rubbed up against reality. Maybe it wasn't enough to make good wine, to live in the glorious beauty of the wine country, to work long, hard hours producing something better each time out.

Maybe we need a beautiful chateau, manicured gardens, even croquet courts. Maybe it's not enough to throw some steaks on the fire and pound down about a case of young reds with the wine buyers from Chicago or New York or even Kansas City. Maybe it's not enough to let them share our joy at the honesty of our labor. Maybe we do have to fly them out, put them up, give them fancy meals, even put roses on their pillows.

All these maybes like some intricate labyrinth. All the mice running about in the maze.

For a while, I didn't get it. I couldn't see what was right in front of my eyes. I believed in the dream. Wine and its production was a joy that America would come to love, and the joy, the humor, the spontaneity, and the irreverence would be embraced by the nation. Wine would be on every table, and every household would be the better for it.

Maybe the neo-drys are too powerful. Maybe capsules will be outlawed, sulphur will be banned, and warning labels will obscure even the boldest label. Maybe sin taxes and initiatives will overburden small wineries until corporate wineries and foreign investors buy them out and acquire their vineyards. Maybe wine won't be the best thing in American industry. Instead, industry will be wine in America.

To hell with the maybes. Will you be able to look at yourself in the mirror?

PWV says Jake Lorenzo isn't funny any more, that's why they won't print some of my columns. I say a dream is dying and like a poet my words scream onto paper.

Dylan Thomas said, "Rage, rage, rage against the dying of the light."

Jake Lorenzo says, "Take a look in the mirror."

When Jake looks in the mirror, his eyes are going to be bloodshot, because if he doesn't drink that second bottle, who will? ■

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CALENDAR

February 9, Saturday
1991 Wine Grape Day, presented by California Association of Winegrape Growers (CAWG), in cooperation with University of California, Davis and California State University, Fresno. Topics: "Short and long-term economic impact on phylloxera outbreak", panel moderator: Dr. James Wolpert, UC Davis; "The major national and international events impacting grape growers", Robert Schramm, Winegrape Growers of America; "The probable impact of the federal wine excise tax increase on winegrape growers", Dr. Dale Heien, UC Davis; "Water requirements of grapes" panel, Dr. Charles Krauter, CSU Fresno, and Terry Prichard, UC Coop Extension; "What to plant? What to pull?" panel; "Economic outlook for the California wine industry", Fred Carmon, Bank of America. **Location:** Radisson Hotel, 500 Leisure Lane, Sacramento, CA. **Time:** 9am - 2pm. **Registration:** Phone CAWG: 916/920-9187.

February 20-23, Wednesday-Saturday
Wine in American Life, VIII International Conference on Gastronomy, presented by American Institute of Wine & Food. The wine industry faces a chorus of policy makers, opinion leaders, and health and consumer advocates who believe that wine and other beverage alcohol should be treated as part of the nation's health and drug problems. Wine industry members and leaders from the fields of government, health, and consumer advocacy will meet and discuss this many-facted subject and to formulate constructive solutions. **Location:** Biltmore Hotel, Los Angeles, CA. **Registration:** Call 415/255-3000.

February 28, Thursday
Selling, Marketing, and Retailing Together Conference — Dr. James Krupi, PhD, keynote speaker; **Topics:** Changing market in Orange County; Wine business in grocery chains; Future of premium wine business. **Location:** Hyatt Regency, 200 S.Pine Ave., Long Beach, CA. **Time:** 9am - 5pm. **Registration:** $185 (includes lunch and wine reception). **Contact:** Innovative Wine Marketing, Tel: 714/960-1369, Fax: 714/960-5970.

March 17-19, Sunday-Tuesday
1991 Monterey Wine Festival, sponsored by National Restaurant Association (NRA). Three evening wine tastings featuring sparkling and dessert wines, white wines, and red wines. Educational programs emphasizing wine and food pairings and a series of luncheons. **Location:** Monterey Conference Center, Monterey, CA. **Cost:** $365 per person. **Registration:** Contact NRA: 150 N.Michigan Ave.#2000, Chicago, IL 60601, Tel: 800/525-FEST, Fax: 312/853-2548.

March 23-25, Saturday-Monday
Chardonnay in the Eastern USA — grape and wine production shortcourse, sponsored by Virginia Polytechnic Institute, Virginia Vineyards Assoc., Virginia Wineries Assoc., and Virginia Winegrowers Advisory Board. This will be a regional meeting of the ASEV/ES. Technical program includes researchers, grapegrowers, and winemakers from New York, California, Virginia, and France and BATF personnel. **Topics:** Viticulture: canopy management, rootstocks, cultural and chemical control for *Botrytis* bunch rot control; and control strategies for grape berry moth. Enology: yeast selection; malolactic fermentation; barrel fermentation and *sur lies*, management of oxidation; fining and stabilization; chaptilization. Survey of North American Chardonnay producers by ***Practical Winery & Vineyard*** and Virginia Chardonnay producers. **Location:** Northern Virginia 4-H Educational Center, Front Royal, VA. **Registration:** Contact: Tony Wolf, Winchester Fruit Research Lab, 2500 Valley Ave., Winchester, VA 22601, Tel: 703/667-8330 OR Bruce Zoecklein, Virginia Polytech. Inst., Dept. of Horticulture, Food Science/Technology Building, Blacksburg, VA 24061, Tel: 703/231-5325.

Grapegrowing/Winemaking Courses University Extension, UC Davis, CA

April 6, Saturday
Topics in Sensory Evaluation of Wine: Chardonnay and Cabernet Sauvignon — Program includes winemakers speaking on production techniques and sensory aspects accompanied by barrel tastings; employs doctored wine samples to demonstrate both flaws and attributes; helps the student build a descriptive wine vocabulary; and blind tasting of representative commercial wines. **Location:** UC Davis. **Instructor:** John Beuchsenstein, winemaker, Hopland, CA. **Time:** 9am - 4:30pm. **Fee:** $155 (includes lunch and tastings.)

April 12, Friday
Legal Aspects of Establishing a Winery — Speakers from the wine industry, legal profession, and regulatory agencies on topics: Agencies, Organizational structure; Federal requirements; California winegrower's license; Registrations and tax requirements; County permit system; Environmental and health considerations; Label registration and trademarks. **Location:** UC Davis. **Time:** 9am - 5pm. **Fee:** $120 (includes course materials and lunch).

April 26, Friday
Hazardous Chemicals in the Winery: Strategies for Regulatory Compliance — Program reviews the employer's obligations for providing a safe and healthful workplace and for managing hazardous waste; including regulations and strategies for complying, with emphasis on Cal/OSHA Hazard Communication "Worker Right to Know" standard. **Instructor:** Doug Krause, health and safety consultant, California Industrial Hygiene Services. **Location:** St. Supery Winery, 8840 St. Helena Hwy, Rutherford, CA. **Time:** 9am - 4pm. **Fee:** $100 (includes course materials + box lunch).

May 4, Saturday
Successful Small Scale Winemaking — For advanced home winemakers who produce small lots of fine wine using minimal equipment. **Topics:** Yeast and malolactic strains; Pinot noir; Zinfandel; Sauvignon Blanc; Sparkling wine production; Syrah; Cabernet Sauvignon; and Chardonnay. Tasting of all wines and discussion included. **Location:** UC Davis. **Time:** 9am - 5pm. **Fee:** $90 (includes lunch and wines).

For further details and to enroll by phone, call 800/752-0881. Davis and Dixon residents or outside California call 916/757-8777.

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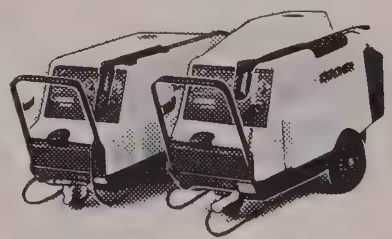

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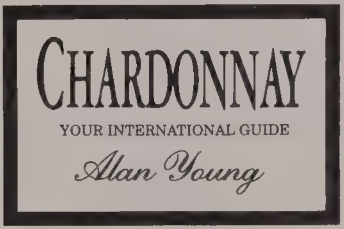

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Letters to the Editor

continued from page 3

1990 election for what it really was. It was **not** about taxing alcohol. It was about money. How to get it. How to keep it. How to stay alive!

There is not enough money to go around in California. Proposition 134 (Alcohol Surtax Initiative) was an attempt to bypass the legislature, using the initiative process, to get funding guarantees to various programs chosen by special interest groups. Necessity has made the people who need that money fighters. They **know** their motives are sincere. They will be back.

We, on the other hand, went into battle against 134 as a confused industry — small vs. large, wine vs. distilled spirits. Money was allowed to blow away in the wind. Just as many people did **nothing** as those who worked their hearts out in the election.

Many of our own organizations did not come out against 134 citing tax implications. We had better get together. No segment of our industry is more important than another. No one can afford not to compromise. Because Prop. 126 (legislative amendment to raise taxes on alcoholic beverages) and 134 did not pass, we did not slay the beast.

Son of 134 is coming! And what a son he is going to be! Imagine him. Written by doctors, nurses, and health care officials, Son of 134 will be another **excessive** tax on alcohol; this time to provide health insurance for all Californians. Doctors will benefit. Nurses will benefit. Health workers will benefit. Programs will have money! Forty percent will go to teachers! No escalator clauses. Now all Californians will benefit.

Try to defeat that!

Draw your own picture, but it **is** coming. We will leave the battlefield as confused as we entered it. We will disband rather than push on. We had better come together. This small victory, the defeat of 134, must be a springboard to a bigger victory.

Attack now 'the alcohol industry' tag. All Californians must see us for what we are — concerned parents, farmers, and leaders in health causes.

Together, we had better support and work hard for a compromise tax through the legislature that 1) is not destructive, 2) has no floor tax provision, and 3) does something for education and health.

We must see that money is spent to educate about abuse. Not proselytize blindly against alcohol.

That is my plea. We have no time. We have to do it now.

Richard de los Reyes
Joseph W. Ciatti Co.
Mill Valley, CA

Editor:

As far as I am concerned, you are the best trade magazine published in the U.S. You concentrate on the needs of the wine industry and avoid the gossip and speculation of other trade journals.

I would like to see more comparison on equipment rather than listing the manufacturer. How have bottling lines, presses, etc., worked for various wineries? I believe you did do this at one time on presses.

Also, if you could keep us in touch with some of the viticultural and enological research taking place in California, New York and elsewhere I'd appreciate it.

Last, but not least, why not publish monthly? Keep up the good work.

Sincerely,
Cameron S. Fries,
White Heron Cellars,
George, WA

Dear Mr. Fries:

Thank you for the generous compliments. We are always striving to give **PWV** readers current, interesting, and applicable information reported in an objective manner. We appreciate hearing that **PWV** readers like it that way.

PWV equipment roundups, such as the roundup on pumps, apprise readers like yourself of what is available in the marketplace. Comparative reports are difficult because, most often, wineries have chosen one make of equipment over another for site-specific reasons. If, however, you are interested in a certain pump, the manufacturer will gladly provide you with names of their customers for you to contact.

Publishing monthly is a topic we often discuss here in the office, and we, as you, also look forward to when it will be possible.

Publishing the results of relevant research in grapegrowing and winemaking is a **PWV** priority. We always welcome reports from researchers in our field.

Don Neel, Editor/Publisher

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Presses include several sizes of the SIPI basket and hydraulic basket presses and a Zambelli electric/hydraulic basket press in two sizes. Featuring a motorized hydraulic system with overhead pressing plate with two sets of baskets (with stainless steel catch basins and support stands), and one carriage (like a pallet jack) to easily move both baskets and the press itself to fill one basket while pressing the other. Capacity: 87-gal or 126-gal.

Electronic control boxes for Howard and other membrane presses are custom-assembled by The Compleat Winemaker with readily available components and a programmable controller for great flexibility in operation.

Please request a list of references of satisfied customers and further information on custom press controls from: **The Compleat Winemaker**, 1219 Main St., St. Helena, CA 94574; Tel: 707/963-9681.

Please see our ad page 32.

■

Criveller Company

The CEP Company of Padova, Italy, is represented by the Criveller Company in North America. Padova is in the heart of the Veneto region, one of the largest grapegrowing areas of northern Italy. CEP manufactures various grape crushing equipment.

Criveller Company is distributor for the CEP destemmer/crusher which offers the following advantages:

The machine is built entirely of stainless steel.

The machine has a speed variator which will control not only the output but also the speed rotation of the perforated cylinder.

All holes on the perforated cylinder are chamfered to easily allow discharge of berries and to prevent cracking and cutting of stems.

The machine has the capability of crushing or not crushing.

There are various models for different output.

Criveller Company also represents a manufacturer of small bladder basket presses. These presses are very inexpensive but produce high quality (low solids) juice.

For further information, contact: **Criveller Company**, 591 Cement Hill Rd., Fairfield, CA 94533, Tel: 707/425-9264; OR PO Box 162, Lewiston, NY 14092; OR 6935 Oakwood Dr., Niagara Falls, ONT., Canada L2E 6S5, Tel: 416/357-2930.

Please see our ad on page 15.

■

Euro-Machines, Inc.

Euro-Machines, Inc. is a subsidiary of the Scharfenberger Company in Germany, the manufacturer of the Europress and the exclusive distributor for Braud grape harvesters.

The Europress stainless steel grape press is the only pneumatic press with a two-speed motor. Using the central filling system, the drum rotates slowly for a higher capacity and less solids. A faster drum speed is for optimal pommace break-up. Two large sliding doors are standard and guarantee easy filling, emptying, and cleaning of the press.

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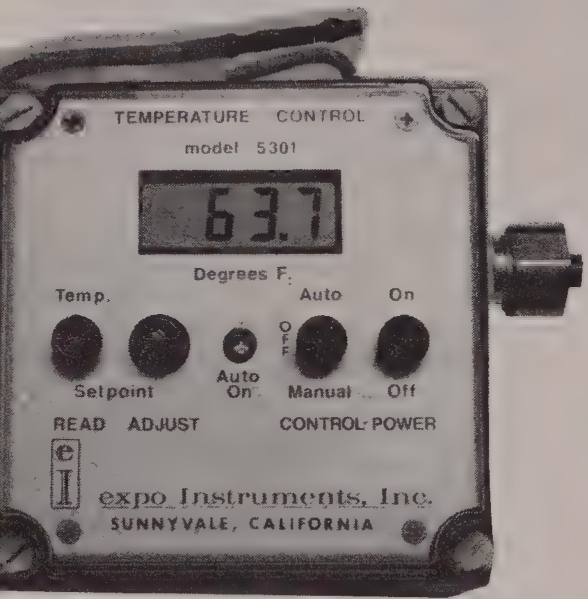
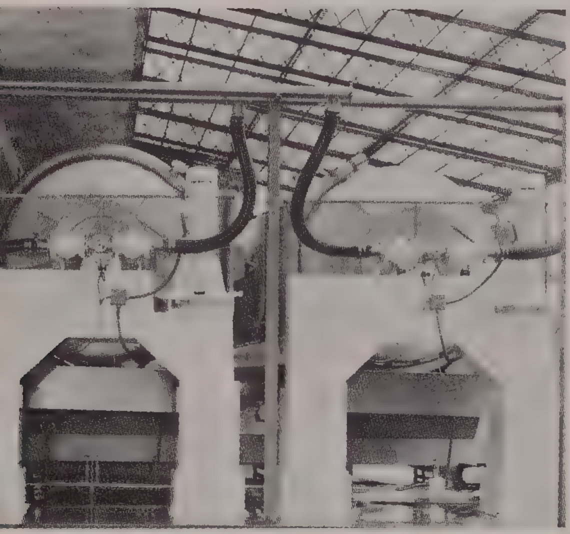
The Compleat Winemaker

Criveller Company

Euro-Machines, Inc.



Expo Instruments Inc.



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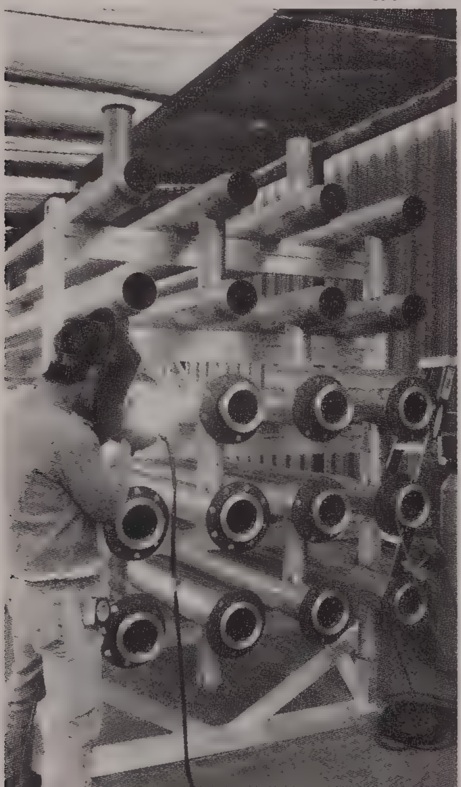

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pump) are built-in and protected against water.

The virtually maintenance-free Europress is available in the following capacities: 1,800-L, 2,200-L, 2,600-L, 3,000-L, 4,000-L, 5,000-L, 8,000-L, 12,000-L, 14,000-L, and 25,000-L. Champagne control for all sizes is available.

The Braud self-propelled grape harvester, model 2720, can be used all year for many functions: spraying, hedging, cultivating and planting, and harvesting. With a new and improved harvesting head, an even gentler handling of the vines and grapes is assured.

The Braud grape harvester, model 524, is a tractor-pulled design. Both harvester models have up to 30% levelling correction and are equipped with a pendulous, self-aligning harvesting head. The Braud harvesters are very easy to adjust for different trellis systems. All functions of the harvester can be operated from the driver's seat.

Euro-Machines can supply grape gondolas with a capacity from 3,200 to 12,000-lbs and are equipped with a stainless steel hopper and auger. The built-in eccentric worm pump and auger are pto-driven. Optional grape break shaft and fold cover are available.

Destemmer/crushers can be ordered, ranging in capacity from 8 to 50 tons/hr and are all stainless steel. All units are equipped with a dosing feed auger to guarantee a continuous feed into the destem basket. The crushing rollers are adjustable for more or less or no crushing at all.

For more information, contact: **Euro-Machines, Inc.**, PO Box 843, Culpeper, VA 22701, Tel: 703/825-5700.

Please see our ad on page 28.

■

Expo Instruments, Inc.

The new low-cost liquid level monitor/control #5303 has been designed by Expo Instruments, Inc., especially for small wineries with small quantities and where budget prices are important.

The unit will look similar to the Expo model 5301 Temperature Control, shown in the photo.

The model 5303 is a continuous-reading liquid level monitor with several options, including controls and alarms tailored for each application.

The system utilizes time-proven, highly reliable capacitance probes, and patented measuring circuits, but with a new approach: utilizing the best state-of-the-art integrated electronics to reduce overall cost and to provide a highly flexible system.

Features include: chemically inert TEFZEL (super tough teflon) probe; high accuracy measurements; weather-proof construction; front panel controls; LCD digital readout in inches and tenths of inches.

For more information, contact: **Expo Instruments, Inc.**, 1026 W. Maude #301, Sunnyvale, CA 94086, 408/245-8822.

■

fp Packaging

fp Packaging is the exclusive North American representative for the Diemme AR series tank press. AR presses are available in capacities from 1,800 to 26,000 liters.

The AR18 and 30 'SP' presses are self-contained and feature a built-in compressor and separate high efficiency side channel vacuum blower. Axial infeed and multiple program PLC controls are available.

Larger AR45, 70, 130, and 260 presses offer a large number of standard features including: multiple program PLC controls, axial feed with adjustable pressure sensor, and oversize doors. Options include: two doors, oversize axial inlet diameter, Diemme's exclusive speed discharge system, and oversize juice bins. Dual juice manifolds are standard on the AR260.

Diemme's PLC control system offers a number of significant advantages over common electro-mechanical systems including self-diagnostic capability and unmatched flexibility in programing.

The winemaker may pre-program up to 13 individual press cycles which can then be selected by the flip of one switch. These cycles are not limited to one type of press profile, rather special programs are available for standard still wine, whole cluster pressing (C.I.V.C. approved champagne) and an exclusive red wine program. Within each cycle the winemaker can set time, rotation, and pressure parameters to fit a specific application.

Both the axial infeed and discharge cycles may be completely automated to suit the winemaker's exact requirements.

Diemme's PLC controls are PC compatible. As an option, one or more presses may be connected with an IBM compatible system which provides the possibility for remote programing, process, and product status, and archiving of data on a load by load basis.

Diemme AR presses are backed by fp

Packaging's extensive support system. A locally stocked comprehensive inventory of spare parts and a factory-trained staff assure prompt and efficient after-sales service and technical support.

For information on how Diemme AR presses can fulfill your specialized pressing requirements, please contact: **fp Packaging, Inc.**, 510 Myrtle Ave., Suite #209, South San Francisco, CA 94080, Tel: 415/742-5400, Fax: 415/871-5950.

■

IRAPP

An investment in a chiller to cool grape must, to offset the heat of respiration prior to fermentation, can pay dividends in many ways. For many years, produce processors have recognized the value of cooling the product soon after picking and apply hydro-cooling to lettuce and other perishables in the picking field.

This process has the three-fold advantage of maximizing freshness and quality, minimizing product loss and reducing the size of the refrigeration equipment required to hold the product at a chilled temperature.

Operating from two locations, IRAPP has built refrigeration packages for 16 years. IRAPP recognizes the value of must chillers and has designed, built, and installed many in wineries throughout California.

The tube-in-tube IRAPP design meets the capacity needs for small or large production wineries. The design offers maximum heat transfer and control with no fouling or blockage due to bulk. Minimum pump capacity is required, which saves energy and operating costs. Maintenance is kept to a minimum.

To provide the refrigeration for the must chiller, the IRAPP design group, with four staff engineers, will custom design the refrigeration package utilizing the latest in system and control technology. To meet your winery's specific needs, the system can be ammonia, freon or glycol to provide dependable fermentation control, barrel room air conditioning, and must chiller cooling operation.

To provide the proper preventive and emergency maintenance for your refrigeration systems, IRAPP maintains three fully-equipped, radio dispatched, service trucks. Service technicians are factory-trained and capable of complete on-site compressor rebuild using parts maintained in stock. They know the importance of keeping your systems on line during key periods of the season and will respond to your needs on a 24-hour call basis.

For more information, contact: **IRAPP**, PO Box 129, Healdsburg, CA 95448, Tel: 707/433-9471.

■

KLR Machines, Inc.

KLR Machines provides equipment exclusively to wine and fruit juice industries. Products include: Vaslin destemmer/crushers and rotary fermenters; both CMMC/Bucher and Vaslin grape presses; Unipektin evaporators, essence recovery units, desulphurizers, dealcoholizers, and specialty heat exchangers.

New for 1991 is Vaslin's Delta destemmer/crusher, which supplements Vaslin's line of ECR destemmer/crushers. In addition to the Vaslin ECR-15 (15-tons/hr), Delta offers capacities of 12, 25, 50, and 80-tons/hr.

Advanced control systems are available on the CMMC/Bucher RPS (18, 27, 37, and 50-hl) and RPX (70, 80, 100, 140, and 250-hl) pneumatic tank presses. Winemakers can choose from a variety of control options, to achieve any winemaking style, ranging from CMMC/Bucher's GE Multiple Press Computer Control System, to Digital or Standard Control Panels with either Cremant or KLR's Non-Rotation options.

KLR Machines has two sales and service offices. *For more information, contact:* **KLR** at 350 Morris St.#E, Sebastopol, CA 95472, Tel: 707/823-2883, Fax: 707/823-6954 OR 47 W.Steuben St., Bath, NY 14810, Tel: 607/776-4193, Fax: 607/776-9044.

Please see our ad on page 7.

L & L Fabricators

L & L serves the wine industry with a complete line of stainless steel tanks and aluminum catwalk. With the help and cooperation of winemakers, we continue in our quest for innovative tank ideas to improve quality and performance.

L & L is fabricating a 50-gallon stainless steel barrel, incorporating replacable French oak ends. A new stackable, self-supporting, modular, forkliftable steel rack will accompany this new vintners barrel. These products are being produced for Pradel Barrels of Napa, CA.

A removable dejuicing system is also being fabricated. This is comprised of a removable dejuicing screen that is mounted on the inside of an existing fermentation tank bottom door. The triangular bars of the screen maintains a barrier for the skins and seeds as the juice flows unimpeded through a drain to the exterior of the door. This system enables the winemaker to drain all the free run from conventional fermentors before removing the skins and seeds. John Kongsgaard of Newton Vineyards, St. Helena, CA submitted this idea.

The wine industry is constantly changing and L & L Fabrication, as a support service, must and will continue to maintain a leading edge. *Contact:* **L & L Fabricators**, 1596 Hampton Way, Santa Rosa, CA 95407; Tel: 707/575-7580.

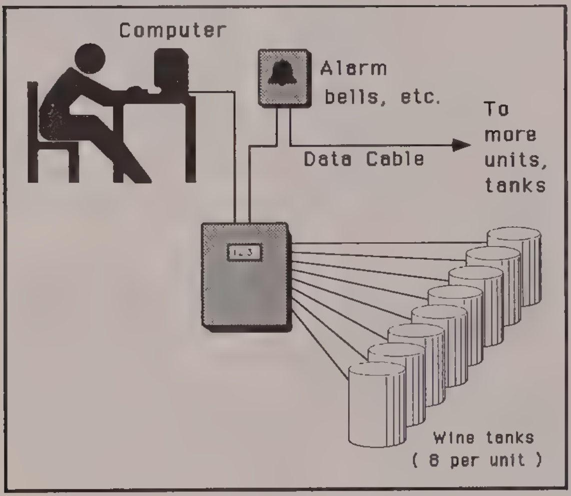
Please see our ad on page 12.

L&L Fabricators

KLR Machines, Inc.

MAG USA Schymanski

Moon Valley Circuits



Napa Fermentation Supplies

MAG USA Schymanski

The Sutter wine press, built in Switzerland is available from MAG USA.

This press is equipped with a diagnostics computer system which allows the winemaker to create press programs. All functions are constantly controlled. A possible malfunction will be shown in a digital read-out. The instruction book tells what to do in order to get the press running. This also eliminates a service call, and can save valuable time.

The winemaker can change any part of the press program: number of rotations while filling, pressing or mixing, time pressure held, clockwise or counterclockwise rotation, increase of pressure. The automatic control is equipped with a standard program with fixed values.

A built-in air compressor supplies compressed air needed if the pressure exceeds 0.2 bars while the vacuum blower produces air for the low-pressure cycle.

The press can be filled by central filling and there is an automatic shut-off of the must pump. The vertically slotted drum and the juice pan are both made of stainless steel. There are no internal drainage screens, making cleaning easy.

The press is available in sizes up to 18 tons.

For more information, contact: **MAG USA Schymanski**, PO Box 5060, Napa, CA 94581; Tel: 707/253-0672.

■

Moon Valley Circuits

The MV-1000 Winery Control System, which is a central monitoring and control system for wine tanks, cold rooms, and refrigeration equipment, is available from Moon Valley Circuits.

The MV-1000 combines the economy and convenience of a desktop computer with a network of rugged remote controllers (RPUs) to provide an easy-to-use, precise, and very reliable system.

Computer screens display all temperatures, cooling demands, and other parameters throughout the system, and history graphs. Settings are adjusted using a 'mouse' pointer, eliminating most keyboarding. A digital display on each remote controller provides a local readout.

Tank temperature is controlled to within 0.1°C (typical) using a proportional method (PID). An energy saving 'setback' mode saves on energy costs by shifting cooling loads to off-peak hours. Flexible alarms warn of problems. The MV-1000 can even warn of coolant loss at an individual tank **before** that tank drifts off-temperature.

Control of the refrigeration equipment provides energy savings, and an early warning of impending problems and easier trouble shooting.

The modular design of the system maximizes reliability and minimizes installation cost, while permiting easy expansion. The MV-1000 is designed to handle power outages, or failure of the computer, without compromising control. The computer may routinely be used for other duties.

For more information, contact: **Moon Valley Circuits**, 12350 Maple Glen Rd., Glen Ellen, CA 95442, Tel: 707/996-4157.
Please see our ad, page 48.

■

Napa Fermentation Supplies

The Hydropress with a revolutionary, patented membrane system is available from Napa Fermentation. The working system of the hydropress is completely automatic; the only manual intervention is the loading and unloading of the grape must.

The membrane is made of hygenic nontoxic rubber with safety features and guaranteed for a long service life. The membrane constantly and uniformly expands to demuster the grape must over the entire cage surface. This enables total pressing of dry grape must without altering the product.

In order to obtain an optimal time/yield ratio, the unit water pressure should be set at approximately 2/3 atm (11 PSI). Once the feeding hoses and the loading and unloading pipes are connected, the working cycle can be put into action. When the pressing is completed, the internal pressure may be eliminated by opening the water outflow tap so that the cage may be easily opened and the pressed grape must unloaded.

The hydropress comes in stainless or painted, and the sizes are from 4-gal to 85-gal capacity.

Napa Fermentation also offers the Zambelli line of crushers. The Manta model provides simultaneous destemming and crushing. The berries are removed from the stems by rotating rubber paddles and driven through holes in the rotating destemming cage while stems exit the end of the cage. The grapes and juice drop into the sump and out a 2-inch must pump. You can supply your own must pump. The Manta is available in stainless steel or painted and will process 7 to 10 tons/hour.

For more information, contact: **Napa Fermentation Supplies**, 724 California Blvd., Napa, CA 94559; Tel: 707/255-6372. **Please see our ad on page 50.**

■

Napa Instrument Co.

The 'Wine Watcher' is a microprocessor-based temperature monitoring and control system designed specifically for winery usage available from Napa Instrument Co.

The Wine Watcher monitors tank and glycol temperature; controls glycol circulation to provide tight temperature control of your tanks, and records temperature and alarm data. Wine Watcher displays temperature and status and allows adjustment of setpoints and sensitivity on your office PC screen. There is an optional phone link for full system access from a remote PC.

Wine Watcher alarms on any off-temperature condition to field panel and PC. After a time delay, the auto phone dial alarm is activated. On power loss, the auto dial feature will be activated.

Wine Watcher inhibits warm glycol circulation on refrigeration system overload.

The Wine Watcher is suitable for small wineries or expandable to 250 tanks.

Wine Watcher will also monitor/control other systems such as: refrigeration, waste water, night air, hot water, filtration, density, energy usage, tanks levels, or weather.

Napa Instrument Co. provides engineering services for all aspects of process measurement and control and panel design and fabrication.

For more information, contact: **Napa Instrument Co.**, 1034 Summit Ave., Napa, CA 94559; Tel: 707/255-6842.

■

Ogletree's

Ogletree's Custom Metals Fabrication, located in Napa Valley for 44 years, specializes in, but is not limited to, wine industry fabrication.

Custom stainless steel fabrication includes: juice pans, receiving hoppers, product lines, screw conveyor systems, and miscellaneous fabrication.

Carbon steel fabrication includes: structural steel, piping systems, dejuicer support structures, barrel racks, fabrication and repair of harvest equipment, and miscellaneous fabrication.

Aluminum fabrication includes catwalk systems.

Ogletree's has staff with experience to assist with layout, design fabrication, and installation.

Ogletree's invites you to get a head start on the 1991 season by calling for a quote on your fabrication needs. *Contact:* **Ogletree's**, 1027 Pope St., St. Helena, CA 94574, Tel: 707/963-3537, Fax: 707/963-8217. **Please see our ad on page 8.**

■

Process Engineers, Inc. (PEI)

PEI can supply several pieces of equipment commonly used for delivery and processing of grapes: grape receiving hoppers, destemmer/crushers, must chillers, presses, and pumps.

PEI has installed grape receiving hoppers built by Scharfenberger and Demoisy. The Scharfenberger hopper is 12-feet to 20-feet long, all stainless steel with teflon coated flights, variable speed drive, etc. The Demoisy hopper sits up on legs and can be built for 5-ton to 20-ton capacities. Either of these units can be mounted on load cells to net weigh and totalize as new grapes are unloaded.

PEI has represented Demoisy of France for 13 years and sold several hundred machines throughout the U.S. Demoisy has always built crusher/destemmers, which are flexible and gentle on the fruit for minimal stem damage and generation of solids. The smaller Demoisy machines come standard with a detachable must pump, which can be used for pumping red pomace.

Demoisy machines are available with a removable, slide-in screen and newer models have a rotating, self-cleaning screen. The Demoisy design offers many combinations of crush before or after destemming, plus various pumps.

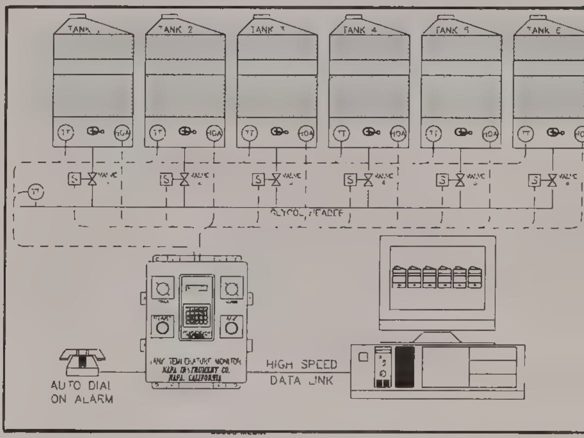
Demoisy models include: V7s (6-tons/hr with or w/o crusher); D8s (18 - 20 tons/hr with or w/o must pump); ET10 (10 tons/hr with rotary screen with or w/o must pump); ET20 (20 tons/hr with rotary screen with or w/o must pump); P-10 (30 tons/hr with fixed screen with or w/o must pump); ET40 (40 tons/hr with rotary screen with or w/o must pump); ET60 (60 tons/hr with rotary screen).

PEI builds must chillers (tube-in-tube) for a wide variety of applications from 1-inch to 4-inch diameter product lines. These units are built to customer requirements. Tube-in-tube heat exchangers can be located on stands or wall-mounted.

The Scharfenberger Europress is available in sizes: 1,800-L, 2,200-L, 2,600-L, 3,000-L, 4,000-L, 5,000-L, 8,000-L, 12,000-L, 14,000-L and 25,000-L. The Europress is a pneumatic membrane press with a central infeed valve and built-in air compressor.

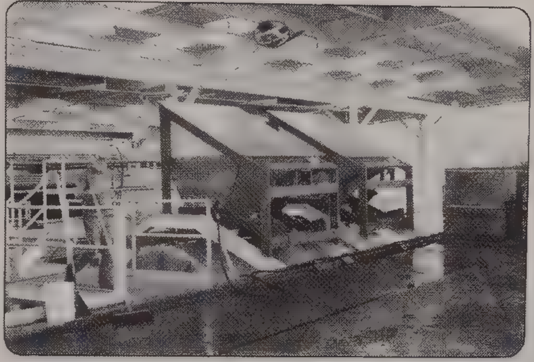
With the growing acceptance of whole cluster pressing, PEI has designed and built a receiving hopper which mounts over the large, 40-inch to 72-inch wide doors of the Europress, for loading of whole clusters. This system has greatly reduced the press loading time.

For more information and assistance in designing grape handling systems, contact: **Process Engineers, Inc.**, 3329 Baumberg Ave., Hayward, CA 94545, Tel: 415/782-5122.



Napa Instrument Co.

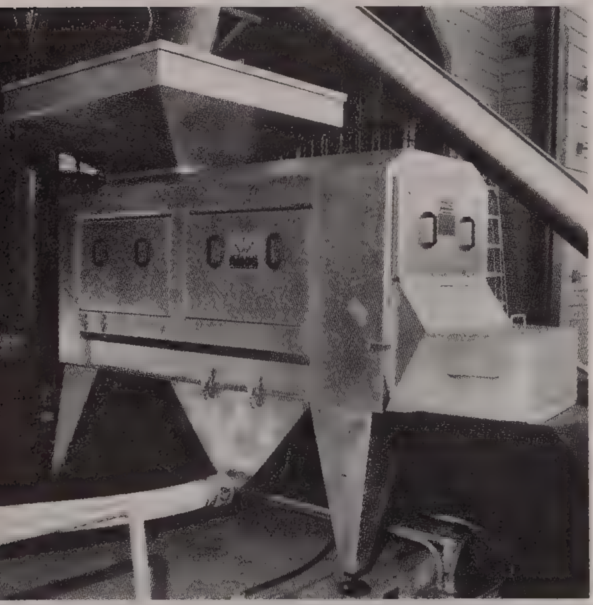
Ogletree's



Process Engineers, Inc.

Prospero's Equipment Co.

Refrigeration Technology, Inc.



R.L.S. Equipment Co., Inc.

Prospero's Equipment Co.

Prospero's and Associated Winery Systems have introduced a new line of Cingano model DRM multi-mode destemmer/crushers to the U.S. market. The Cingano offers several important new design features critical to premium wine production.

Multi-mode operation gives the winemaker complete stylistic control over the crushing operation. The Cingano has a variable destemmer bypass to allow any fraction of stem return, variable speed destemmer drive, and crusher bypass.

The destemmer screen and beaters have variable speed drive. This allows the operator to adjust the action of the screen and beaters to the condition of the grapes. This prevents excessive stem or fruit damage during destemming.

Below the destemmer, the crushing rollers are durable foodgrade rubber. There is an automatic jam/overload shut-off system. In event of debris jamming the rollers, the drive motors are instantly shut-off to prevent damage.

The entire crusher roller assembly is mounted on a track beneath the destemmer outlet. This allows the operator to slide the crusher (on wheels) out of the fruit path for whole berry return.

These features allow optimum processing of each grape variety for each style of wine produced. There is complete control of each phase of the process. The entire machine is built of stainless steel. Easily removed access-covers allow quick clean-up.

Cingano DRM destemmer crushers are available in capacities from 10 to 50 tons/hour.

Pictured is the model DRM-30 at Chateau Montelena Winery, Calistoga, CA.

Many DRM crushers have been installed with the Strazzari elliptical lobe must pumps. Capacity of the Strazzari model GU-6 pump is 18 tons/hour of crushed grapes or pomace. Hopper fed, it is an extremely gentle pump that can pump whole clusters with a minimum of fruit damage.

The GU-6 comes with a wheeled cart that 'kneels' down for operation. This gives the pump a very low profile to fit under fermenter manways or crushers. Lowered, four anti-vibration pads grip the floor to prevent the pump from moving. The standard GU-6 has a stainless steel body, hopper, auger, and 7.5-hp motor, and 100 or 120-mm discharge hose outlet.

For more information, contact: **Prospero's Equipment Co.**, 914 Marble Ave., NY 10570, Tel: 1-800/332-2219 OR **Associated Winery Systems**, 7714 Bell Road, Windsor, CA 95492, Tel: 1-800/228-0664. **Please see our ads on pages 26,30.**

■

Refrigeration Technology, Inc.

Refrigeration Technology can provide improved energy management in wineries. They have developed a computer system to monitor the refrigeration loads and cycle compressors on demand. In addition, the computer system provides diagnostics and alarm functions.

The computer system was approved for rebates from Pacific Gas & Electric (PG&E). They have installed computer systems in 24 wineries.

The computer has been expanded to control glycol pumps and condenser fans. This was followed by an industrial humidifier to reduce topping losses. It provides a two-month payback on 1,000 barrels. 100 humidifiers have been installed in barrel rooms by Refrigeration Technology.

Heat exchangers have been designed to solve problems. The model 420 must cooler (in photo) is designed to hold ten 4-inch tubes 20-ft. long; four tubes were installed in 1990. The winery can expand the chiller as needed. In addition to must coolers, heat reclaim heat exchangers are used to heat water or glycol.

Refrigeration Technology can provide glycol chillers, electronic tank controls, and much more. For more information, call 707/792-1934 or Fax: 707/792-1417. **Please see our ad on page 63.**

■

R.L.S. Equipment Co., Inc.

RLS offers the following lines of high-quality equipment for every stage of wine production.

For crushing, destemming, and fermenting, AMOS is the answer. AMOS destemmer/crushers are constructed of stainless steel, and equipped with square hole baskets of stainless steel or Hostalen. Features of the AMOS machines include: adjustable crushing rollers, low maintenance, and extremely gentle action resulting in high whole berry counts. Models include capacities from 10-ton/hr to 80-ton/hr; single or vari-speed.

AMOS stainless steel fermentation tanks can be used for dejuicing, storage, and fermenting. All tanks are equipped with auto-emptying, juice pump-over, and integrated cooling and punch-down paddles.

For use in conjunction with a destemmer/crusher or fermenter, AMOS and KIESEL progressive cavity pumps are available, ranging in size from 5 to 100-TPH. All models are equipped with reversal protection switches, can be fitted with hi/low probes, and are ideal for transferring must, fermented must, and whole clusters. A variety of designs and configurations are available, including open throat and hose-fitting.

KIESEL also manufactures centrifugal and impeller pumps, mixers, and heat exchangers. Centrifugal and impeller pumps are ideal for the transfer of juice, and available in many sizes. Mixers are available with various noses, and competitively-priced. Heat exchangers, tube-and-shell design, are stainless steel and offer excellent efficiency due to their unique design.

Pressing means WILLMES, and both the Tank Press and Universal Press provide high yields and low solids in the juice. Both designs come with a variety of options and capacities.

For more information, contact: **RLS Equipment Co.**, 609/965-0074 or the West Coast office at 800/527-0197.
Please see our ad on page 48.

Santa Rosa Stainless Steel (SRSS)

Dejuicing tanks from SRSS can sharply increase winery efficiency. Developed in 1975 in conjunction with Zelma Long of Simi Winery, they eliminate manual transfer of must, with the tanks dumping directly into a press.

A system of two to six static drain tanks can be managed by one person. As soon as trucks arrive, grapes are crushed and loaded into the tanks, eliminating costly hauling delays.

Juice can remain in contact with the skins for an hour, or up to 12 to 16 hours. Dejuicing capacity through an 18-square-foot screen is about 2,100 gallons/hour, without a pump. From 100 to 130 gallons of free-run juice per ton, with 0.5% solids, is extracted. Additonal juice is recovered through the press pans both before and after pressing.

Press time is cut in ½ by draining free-run juice through the screens. The screens are attached to the sides of the tank on frames, hinged for easy cleaning. The design allows must to be dumped into the press without removing the screens.

For more information, contact: **Santa Rosa Stainless Steel**, PO Box 518, Santa Rosa, CA 95402, Tel: 707/544-SRSS, Fax: 707/544-6316.
Please see our ad on page 22.

Scott Laboratories

Scott offers destemmer/crushers from Rauch. These stainless steel machines are made in Germany and feature an overhead destemming cylinder with crushing rollers underneath. The destemming cylinder is removable and the gap between the rollers can be altered to provide the winemaker many options.

Rauch machines are sold in three models: A/8, A/12, and A/20. They can be supplied as stand-alone units or with dump hoppers and pumps. Vari-speed is available as an option.

Willmes presses are sold exclusively by Scott, west of the Mississippi River. Willmes offers enclosed tank (TP) membrane presses in 5, 7, 10, 12, 15, 20, 25, and 32 metric ton capacities. Open tank (UP) membrane presses are available up to a 5,000-L size.

Rotary fermenters (Technomacers) from Velo are available. These are horizontal, self-emptying tanks with refrigeration jackets. They are state-of-the-art and ideal for making fruity wines with low tannin. These are available from quite small up to 16,000-gal size.

Scott also offers a variety of pumps for the crush. These include progressive cavity pumps from Rauch and Alweiller, and Manzini piston pumps.

Scott maintains a full-time parts and service department with a huge inventory to service crush-related machinery. Pre-crush checks are available on request. A 24-hour hotline to Scott Service is provided throughout each harvest.

For more information, contact: **Scott Laboratories**, PO Box 750249, Petaluma, CA 94975-0249, Tel: 707/765-6666 OR 860b Brock Road South, Pickering, Ontario, Canada L1W 2A1, Tel: 416/839-9463.
Please see our ads on pages 19,39,41.

SEN Machines, Inc.

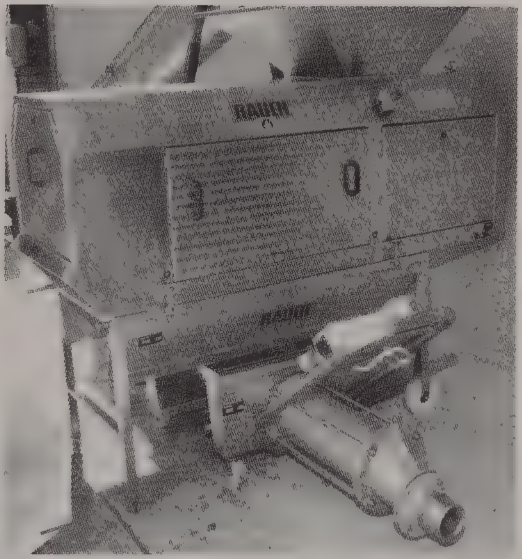
SEN Machines, Inc. is the exclusive U.S. supplier of Armbruster equipment built in Germany.

The equipment includes destemmer/crushers with capacities of up to six tons/hr, 15 tons/hr, 30 tons/hr, and 50 tons/hr. The machines are fabricated from heavy gauge stainless steel with stainless steel beater bar and polypropylene plastic stripping cylinder. Crush rollers are rubber with roller clearance adjustable from approx. 3-mm to 25-mm. Optional fixed or variable speed drive is available.

Armbruster can also supply various size grape receiving hoppers with auger feed to the crusher. There are a range of must collectors with auger feed, to either an integrated progressive cavity must pump, or without pump, for supply of must to a remote must pump. The equipment design is flexible. Custom features may be ordered to suit individual requirements.

For more information, contact: **SEN Machines, Inc.**, 1350 Industrial Ave., Suite-G, Petaluma, CA 94952, Tel: 707/763-4844, Fax: 707/763-6997.
Please see our ad on page 11.

Santa Rosa Stainless Steel



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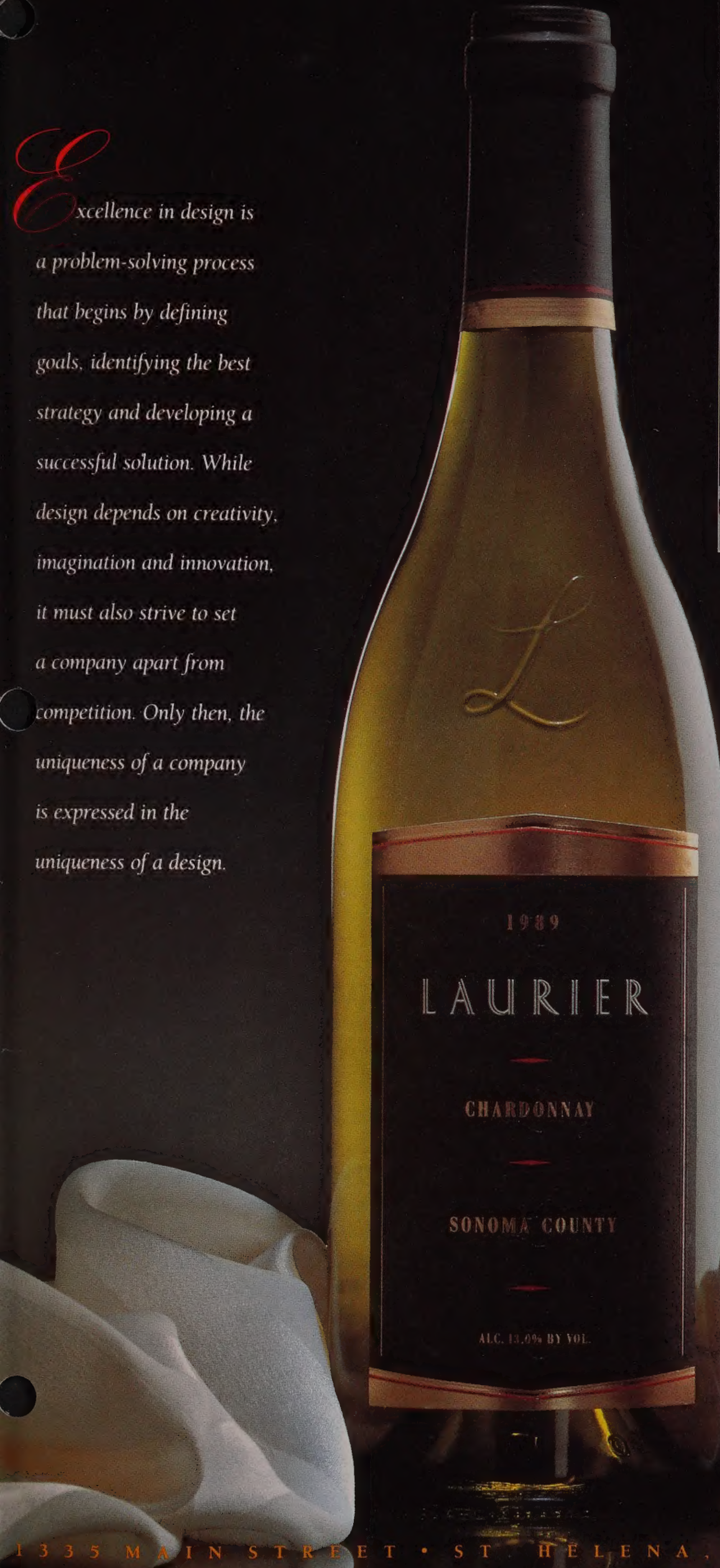

Guerrilla marketing weapons

By Jay Conrad Levinson

Most wineries are aware of five or ten marketing weapons, but usually employ only two or three of them.

In contrast, guerrillas are aware of 100 marketing weapons, and use between 40 and 60 of them. Fortunately for your winery, about half of these marketing weapons are free.

One example of such a weapon is in-store signs. The Point-of-Purchase Advertising Institute reported that a full 70% of purchase decisions in 1989, were made at the place of purchase.

Many people enter a store with the vague idea of buying wine, but don't decide *which* wine until they face shelves of bottles. Because in-store signs can generate impulse purchases, a winery should place special emphasis on this marketing weapon.

Many guerrilla marketing weapons aren't even recognized as part of marketing. Examples of these are the hours of operation and the way employees say hello and goodbye to customers and prospects. These powerful selling tools are frequently neglected by businesses.

In this limited space, I won't be able to discuss all 100 weapons. But they are all listed in two of my recent books: *Guerrilla Marketing Attack* (Houghton Mifflin, February, 1989) lists the weapons, and *Guerrilla Marketing Weapons* (New American Library, November, 1990) examines in-depth the whole gamut of weapons.

Actually there are many more than 100 marketing weapons. To a winery, hang-tags are weapons. So are back labels, which give you an opportunity to spur word-of-mouth marketing by putting the right words in the right mouths at the right time. Cases are mere shipping containers for some companies, but potent weapons for wineries.

A winery also should consider by-the-glass programs, and 'fusion arrangements' (or tie-ins) with restaurants as weapons. Certainly direct mail to people who have visited your winery is important in your arsenal.

Few businesses can form a 'club' for customers better than a winery. What do club members get? A newsletter and possibly discount prices. It would be great if they could receive (or purchase) wine glasses with both the ***winery*** name and ***their*** name on them. Because of the inherent snob value of virtually ***any*** wine, a membership certificate would be in order.

Distribution is a crucial weapon. Guerrillas get their word distributed by producing 25-second TV commercials, leaving the final five seconds blank for the name of stores and/or restaurants carrying the wine. This is called 'forcing distribution' and works nearly every time.

The idea is to use as many of the weapons as are feasible for your winery and affordable to your budget. My average client uses 47 of them. In the true spirit of guerrilla marketing, many of the weapons require time, energy, and imagination rather than the brute force of a mega-budget.

A guerrilla seeking market share has to know about other weapons, such as word-of-mouth marketing, electronic brochures, wine catalogs, and testimonials. You're going to be forced to learn the truth about public relations (you need the weapon of publicity contacts to get free publicity).

You're going to have to knock yourself out becoming a winery that is 'easy to do business with' — a reputation few wineries enjoy, but one that is crucial for your financial survival. Many guerrilla marketing weapons are designed to give you that kind of reputation.

Some wineries think marketing means advertising. But guerrillas know that advertising is only one of the 100 marketing weapons, and not even the most effective one at that.

I urge you to do as much as you can about as many as you can. Guerrillas do; that's why they succeed. ■

(Jay Conrad Levinson is the author of "Guerrilla Marketing", "Guerrilla Marketing Attack", "Guerrilla Marketing Weapons", and publishes "The Guerrilla Marketing Newsletter". To order or request a free brochure on these and other products and services, call toll-free 800/748-6444. In California, call 415/381-8361.

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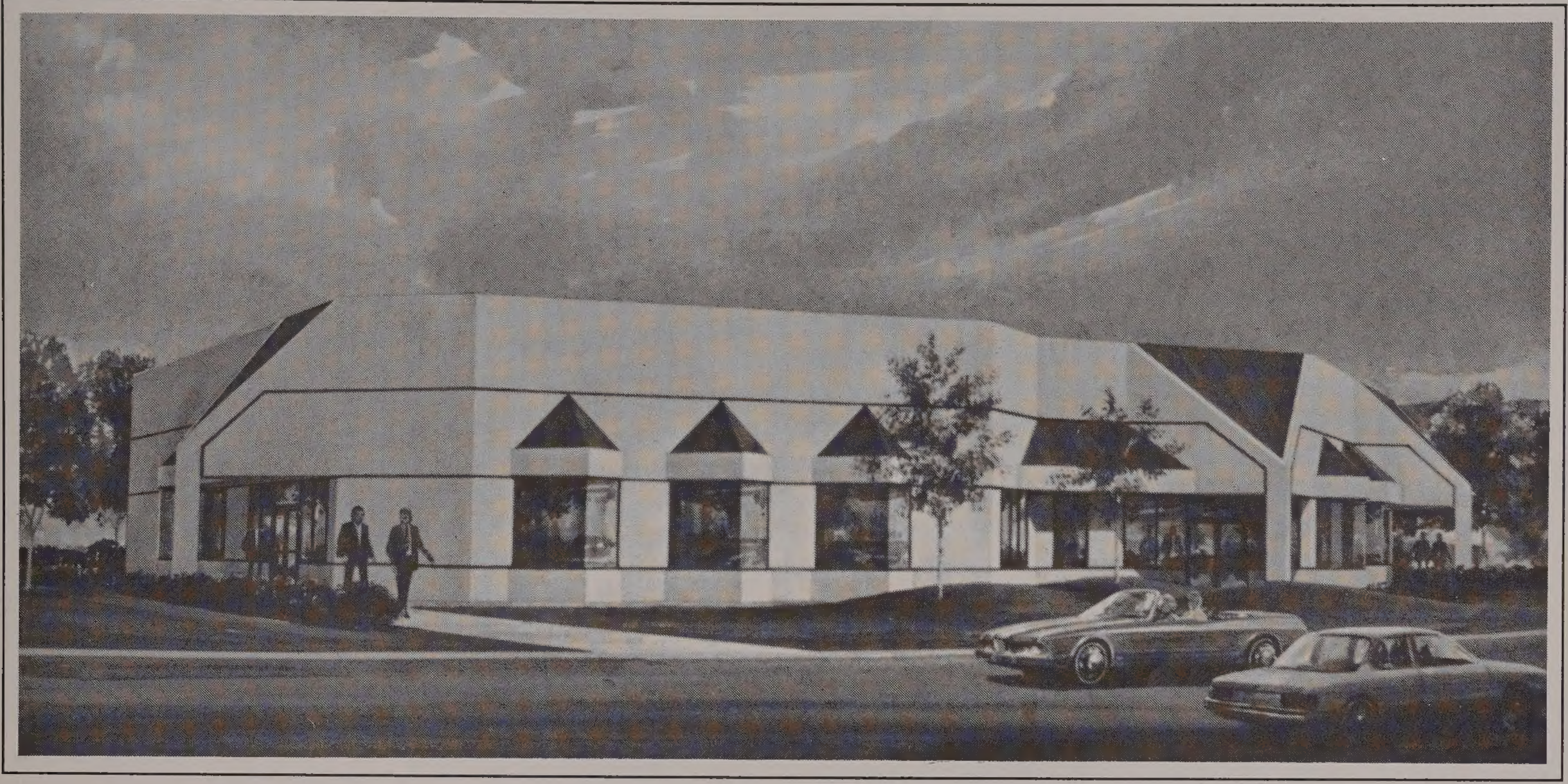

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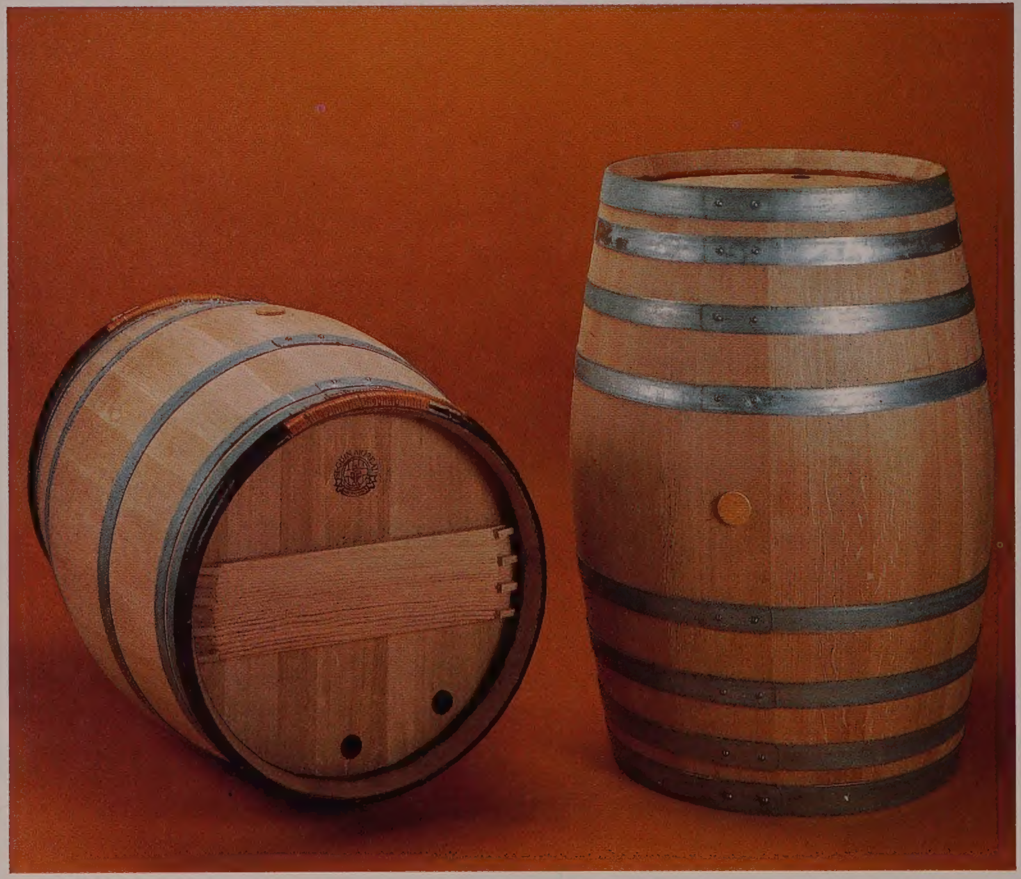

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